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Fowler Fears Effect of Delayed Breakup

MONTREAL—Heavy snow last winter, unusual spring rains, and the delayed break-up has so increased the volume of water coming down Canadian rivers that the pulp and paper mills are experiencing great difficulty in maintaining their output of newsprint.

R. M. Fowler, president of the Canadian Pulp and Paper Association, stated this week that in some areas power supplies had been interrupted and roads were impassable for the movement of wood by truck. Some rivers were at an all-time record high level and had spread over the countryside, and in order to prevent pulpwood being beached on the farms and in the bush it has been impossible to put the wood in the streams.

East of the Rocky Mountains, said Mr. Fowler, driving operations were about three weeks later than normal since cold weather delayed the spring breakup. "Some machines have been forced to shut down intermittently," said Mr. Fowler. "The continuing interruption of power supplies and the movement of pulpwood will make full capacity production impossible in the immediate future.

"Many mills have nearly reached the bottom of their pulpwood piles and are dependent on the spring log drive for a continued supply of raw material. If the wood doesn't arrive on schedule, some temporary curtailment of operations will be unavoidable."

"In any case," Mr. Fowler added, "adverse weather conditions may prevent adequate pulpwood supplies being available for next winter's and next spring's operations."

Three Smith Paper Mills Shut-down for Vacations

LEE, Mass.—The Smith Paper, Inc., has scheduled the following vacation shut-down periods:

Eagle and Niagara mills will close June 28 and reopen on July 14.

The Columbia mill, exclusive of the wash mill, will close Aug. 16 and will reopen at 7 a.m. on Sept. 2.

The Columbia wash mill is not expected to close but all employees will be granted vacations while the mill is operating.

Maintenance crews will be granted vacations in the usual manner, as they must be available during shut-down periods at all mills.

War Department Clears Way for Coosa River Newsprint Mill

Chicago Waste Steady School Collections Off

CHICAGO—Waste paper prices in this area held steady last week with mills reported to be paying $16 a ton for No. 1 mixed, $20 for No. 1 news and $30 for No. 1 old corrugated, delivered. Some dealers report a most noticeable slow down in paper receipts, with the stopping of school collections which have grown to be a most helpful source of supply to the industry. In fact, almost without notice, the trade has learned to depend materially on voluntary collectors who "got the habit" during the war years. Nowadays, one finds not only the school children out collecting waste paper for various funds, but fire departments, women's organizations, patriotic groups and others are continuing their war time efforts, having learned that at least one way of enriching treasuries is to get out and collect waste paper. "Without this new found ally," said one Chicago waste material dealer, "the industry would have been hard pressed to even keep at its present point. We ought to not overlook the value of continuing and encouraging these methods at least until the present crisis is past."

Paper and Twine Ass'n Will Discuss Mill-Dealer Relations

CHICAGO — R. C. Johnson of the Fletcher Paper Company and Gurney H. Stidham, Schwarz Paper Company, are representing Chicago on a panel discussion to be held in conjunction with the Paper & Twine Association meetings to be held June 20 and 21, at the French Lick Springs Hotel, French Lick Springs, Indiana. Johnson will offer the viewpoint of the fine paper manufacturers in a discussion of "How Can Existing Relationships Between and Among Manufacturers, Converters and Wholesalers Be Improved?" while Stidham will represent the wrapping wholesalers. It is reported that this type of discussion meeting received its initial impetus when the western division of the Salesmens Association of the Paper Industry had such splendid success with it at its weekly luncheon meetings during the early Spring.

BIRMINGHAM, Ala. — The Coosa River Newsprint Company has just made known its plans for construction at Childersberg of the Southeast's first newsprint mill—to cost $30,000,000. Construction is to be started within a few months. Operation is expected to be under way in two years. The mill will have an estimated capacity of 100,000 tons of newsprint a year. The final barrier was removed June 12 when leases were signed by the War Department and the Coosa River Newsprint Company, which will operate the mill.

The project was conceived during the early '30s by a group of Southern newspaper publishers and has just been pushed to completion by the newsprint committee of the Southern Newspaper Publishers Association, with Clarence B. Hanson, Jr., publisher of the Birmingham News and Age-Herald, serving as committee chairman. The movement was initiated some years ago with the appointment of Carl B. Short, general manager of the Roanoke Times and World-News, as chairman. On being elected president of SNPA he was succeeded by Mr. Hanson. Mr. Short died of a heart attack June 14, 1946 while in Washington, D. C., attending a meeting in the interest of newspaper publishers.

Tribute to the work done by Edward L. Norton, widely known Birmingham business man and president of the Coosa River Newsprint Company, was voiced by Mr. Hanson. Mr. Norton has labored unceasingly for the past 18 months to acquire a site and needed properties for the projected newsprint mill.

"Shortage of newsprint has been an acute problem to the South's newspapers for many years now," Mr. Norton said. "We have worked on the problem a long time. There were many obstacles. But the way now is clear.

"This new mill will provide a source of newsprint vitally needed by newspapers throughout the South. It will enable them to supplement their present sources of supply and should make for smoother year-round operations."

Specifically, the company purchased 615 acres of land in the 18,000-acre

(Continued on page 28)

May Set New High in Newsprint Production

NEW YORK—Production of newsprint in Canada during May 1947 amounted to 384,520 tons and shipments of 400,763 tons, according to News Print Service Bureau. Production in the United States was 73,498 tons and shipments were 70,997 tons. The output in Newfoundland was 28,381 tons and shipments were 29,438 tons making a total North American production of 486,399 tons and shipments of 501,198 tons. Total production in May 1946 was 457,673 tons and shipments were 463,066 tons. North American production in May 1947 was greater than that in any preceding May, and also exceeded that of any month on record.

The Canadian mills produced 169,032 tons more in the first five months of 1947 than in the first five months of 1946, which was an increase of 10.1 percent. The output in the United States was 18,105 tons or 5.5 percent more than in the first five months of 1946; in Newfoundland production was 952 tons or 0.6 percent more, making a total increase of 188,089 tons, or 8.8 percent more than in the first five months of 1946, and also was higher than in any preceding similar period.

Stocks of newsprint paper at the end of May were 110,323 tons at Canadian mills, 11,426 tons at United States mills, and 82,409 tons at Newfoundland mills, making a combined total of 204,158 tons compared with 218,957 tons on April 30, 1947, and 190,877 tons at the end of May 1946.

Wilterding and Smith On Lawrence College Board

APPLETON, Wis. — John Wilterding, Menasha, treasurer of the Banta Publishing Company, and William H. Smith, a Milwaukee high school teacher, have been named to the Lawrence College board of trustees, as representatives of the alumni association. Each will serve three years. From 1939 to 1945, Wilterding was alumni secretary of Lawrence. He is editor of the college alumni magazine. Smith, who will be serving his second term on the board, is executive secretary of the college's Memorial Union fund drive.

Iowa Paper Distributors Discuss Market Outlook

CEDAR RAPIDS, Ia.—Iowa is reported to have one of the most enthusiastic of the many paper distributor organizations now in existence. Recently the Iowa Paper Distributors Association met in Cedar Rapids with representatives of eleven member firms on hand to discuss the market outlook, operational costs, the conditions of inventories and some serious consequences of the tightness of the paper market. D. W. Smith, president of the group, appeared on the program along with W. D. Leathers, assistant secretary of the National Paper Trade Association. Smith is secretary and sales manager of the Clinton Paper Company of Clinton, Iowa. Other officers of the Iowa group are: R. P. Murphy, Peterson Paper Company, Davenport, vice-president; H. F. Stoffle, Pratt Paper Company, Des Moines, secretary; and B. N. Shean, Baker Paper Company, Cedar Rapids, treasurer.

Find Box Car Shortage Acute And Fall Outlook Worse

CHICAGO — The paper trade here is extremely interested in the report relayed here by salesmen in the East concerning an overall picture of the freight car situation. Sales representatives and jobbers alike have learned that there are, for example, 699,000 box cars in circulation with 800,000 more needed. More cars are being retired each month than are made. The situation is getting worse. These facts have been relayed to the trade by experts who report that the industry hopes to build 10,000 a month starting July 1 of this year. Even if this is accomplished, say reports, it would not be soon enough to ease the shortage bound to occur this fall due to movement of bumper crops. It will probably be another year before shipping can be called normal. Even then it will take 100 percent cooperation of shippers to bring this about. This fall, with huge wheat crops to be moved, students of the situation feel there will be only 64 percent enough cars available.

Professional Paper Group Leaders Take Over Duties

CHICAGO — While they will not be formally installed until the first Fall meeting, new officers of the Progressional Paper Group, TAPPI's Chicago section, will take over their duties on July 1. Meanwhile, the June meeting of the Group will take the form of an all day outing at Starred Rock Lodge on June 28. J. L. Kubicka, Container Corporation of America, succeeds F. D. Long of the same company, as president of the Group. H. J. Bettendorf, Fibre Containers publication, becomes vice-president while R. O. Benson, Dearborn Chemical Company, and S. K. Seiss, Arrco Playing Card Company, have been elected secretary and treasurer respectively.

Mountain Waterproof Papers Files Articles of Association

MONTPELIER, Vt. — Articles of association have been filed with the secretary of state's office by Mountain Waterproof Papers, Inc., of Bellows Falls. The company is incorporated to manufacture paper, pulp and paper products. It listed a stock issue of 100 shares of common stock at no par value.

Newspapers Dip Into Their Inventories

NEW YORK—Daily newspapers reporting to the American Newspaper Publishers Association had stocks of newsprint in transit and on hand representing an over-all average of 28 days' supply at the end of May 1947. This is the lowest days supply on record. This supply of 28 days at the end of May compares with 32 days at the end of May 1946, 43 days at the end of May 1945 and 36 days at the end of May 1941.

Daily newspapers reporting to the ANPA consumed 302,994 tons of newsprint in May 1947 compared with 261,484 tons in May 1946 and 260,827 tons in May 1941. This was an increase in May 1947 over May 1946 of 15.9% and an increase over May 1941 of 16.2%. The year 1941 was the base for calculating allowable use for newspapers under WPB Order L-240 until revoked effective December 31, 1945.

The total estimated newsprint consumption in the United States for May 1947 was 415,060 tons which includes all kinds of uses of newsprint. For the first five months in 1947 it is estimated to be 1,956,127 tons. During the first five months of 1947 the reporting newspapers used 1,427,973 tons of newsprint, an increase of 15.9% over the first five months of 1946 and an increase of 16.6% over the first five months of 1941.

Commerce Office Warns Of Ecuador Credits

WASHINGTON—Because of an unprecedented flow of goods into Ecuador, and a consequent curtailment of credit by local banks, American exporters were warned last week by the U. S. Department of Commerce's Office of International Trade to "exercise caution" for the present in extending credits to importers in that country.

According to a report from the American Embassy at Quito, Ecuador has been flooded with goods from abroad, warehouses are overloaded—relaxed controls on imports last January, being blamed. Among other commodities, newsprint was reported being stored in open lots, unprotected from rain or sun.

Schwarz Paper Acquires Morgensen Paper & Supply

CHICAGO — Schwarz Paper Company is reported to have recently purchased the Morgensen Paper and Supply Company, wrapping paper merchants of Madison, Wisconsin. The announcement was made by Edward J. Loewenthal, president, who stated there will be no change in the personnel of the acquired firm while the Schwarz warehouse in Madison will be taken into the new branch operation.

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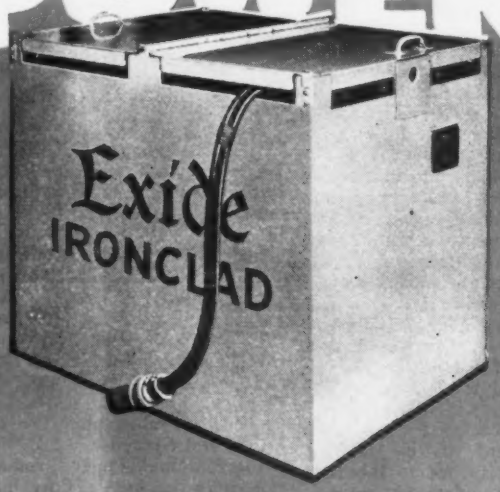

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Haug's Work on Guar Wins Steele Medal

APPLETON, Wis.—Following the regular Commencement exercises at Lawrence College on Sunday afternoon, the Westbrook Steele gold medal was presented by its donor to Dr. Arthur John Haug of Wauwatosa, Wis. The Steele medal is presented to that candidate for the degree of Doctor of Philosophy selected by the faculty of the Institute who, among other qualifications, shows originality and soundness of approach to his problems, exhibits an ingenuity of techniques and thoroughness of investigation as an understanding of the relation of the Ph.D. subject under investigation to the broader problems of the pulp and paper industry, and shows craftsmanship in the preparation and presentation of his dissertation.

Dr. Haug graduated from Marquette University in 1941 with a Bachelor of Science degree cum laude. He entered the Institute the same year and received his Master of Science degree in 1943. During World War II he spent seventeen months at Oak Ridge, Tenn., where he was associated with the analytical department of the atomic bomb project. He returned to the Institute in 1945 to complete his course work and his dissertation. The latter deals with certain chemical and physical properties of the mucilage from the guar seed, a product recently developed at the Institute by Dr. B. W. Rowland as a substitute for locust bean gum, and used for the improvement of the properties of the paper sheet.

The other recipients of the Westbrook Steele medal are: 1941, Robert A. Stillings; 1942, William H. Lane; 1943, Daniel O. Adams; 1944, Charles M. Sigvardt. No awards were made in 1945 and 1946 because degrees were not awarded in those years.

Eagle Lodge Accepts Ten-Cent Pay Hike

HOLYOKE, Mass. — By a sizeable majority, Eagle Lodge of Papermakers on June 15 voted to accept a salary increase of 10 cents per hour across the board, which had been offered as a final counter-proposal by paper manufacturers in extending labor negotiations which had been marked by union threats of a walkout in all of Holyoke's paper mills. The pay boost is retroactive to June 1.

Decision to accept the proposition apparently brings to a close the heated negotiations in progress over the past months. Labor had sought 20 cents an hour initially, and had lowered its demands in successive stages to 11½ cents.

Paper Mill Workers Union, Local 226, which embraces the finishing trades, will meet later in the week to consider the hike, and in all probability will accept the offer. Both unions bargain jointly in contract negotiations.

During the course of the negotiations, the four-man negotiating committee of Eagle Lodge of Papermakers had been authorized to call for a strike vote, when they became hopelessly deadlocked with the management in the course of the contract sessions.

Other items in the bargaining included a check-off system, group insurance, overtime pay for Saturday regardless of hours worked during the week, severance pay, reclassification of rates for millwrights, six paid holidays.

International Names Manager In New Orleans and Los Angeles

NEW YORK — International Paper Products Division of International Paper Company has appointed district sales managers in New Orleans, La., and Los Angeles, Calif. H. Currie is the district sales manager in New Orleans at 4106 Canal Street. After July 1, Frank N. Gladden will be district sales manager in Los Angeles at 7232 Sycamore Trail, Hollywood 28.

International Paper Products Division has ten other district sales managers, located in Atlanta, Baltimore, Boston, Camden (Ark.), Chicago, Cleveland, Philadelphia, Pittsburgh, St. Louis, and Syracuse, N. Y.

International Paper Products Division sells the heavy-duty multi-wall kraft paper bags made by Bagpak, Inc., and George & Sherrard Paper Company, wholly-owned subsidiaries of International Paper Company. The largest users of these multi-wall bags are the cement, fertilizer, lime and limestone, food products, and chemical industries.

Start Rebuilding at Beaver Dam Mill

BEAVER DAM, Pa.—Preliminary work is well under way in a reconstruction program for the Beaver Dam paper mill, which was destroyed by fire some three months ago. The debris has been cleared away, and several tons of soaked paper and pulp have been dug from the ruins. It is expected that four months may be required to recondition the property and to install some improvements which have been ordered. Production, it is hoped, will be under way by autumn.

Pacific Paperboard Orders 100-Ton Newsprint Machine

LONGVIEW, Wash. — The Pacific Paperboard Company has ordered a new newsprint machine with a 160-inch Fourdrinier width and a rated speed of 1200 feet per minute. Its capacity is stated to be 100 tons daily. Delivery is expected within 14 months.

The new machine which will be supplied by Moore & White, Philadelphia, Pa., is to incorporate a number of advanced design features, including provision for speedy replacement of wires and felts. It is to have sectionalized electrical drive, to be equipped with anti-friction bearings throughout.

George K. Gibson Day Held By SAPEYE'S

CHICAGO—George K. Gibson, executive of the Mosinee Paper Mills Company and for years membership chairman of the Salesmens Association of the Paper Industry, had a "day" all his own on Monday noon, June 16, when the weekly meeting of the western division turned into a sincere tribute in Gibson's honor for his contribution not alone to the SAPEYES but to the entire paper trade. "George Gibson Day," reported Eddie Edwards of the Howard Paper Company, western division vice-president, "is a living testimonial to a grand gentleman for the many years of service he has given us. He has been more instrumental than any one man in building up not alone the membership of the SAPEYES, but in contributing to its prestige and recognition within the paper trade and without. Many of the programs which the SAPEYES have carried out to the betterment of the entire industry can be traced to the sincere and intelligent enthusiasm of George K. Gibson."

R. C. Swan, Champion Paper and Fiber Company, was on hand as guest speaker. and discussed the expansion and future plans of his company.

The western division got an insight into business conditions in five major distributing centers of the country when L. Q. Youell discussed this subject at the Monday noon, June 9, meeting at the Hotel Sherman.

Bag and Paper Men Plan Another Day in the Sun

NEW YORK—Relaxation and revelry are expected to be mixed in judiciously proportioned amounts at the thirtieth annual golf outing of the Metropolitan Bag and Paper Distributors, when they gather, August 14, at Bethpage State Park. Those who know the expert touch of Louis Silfen, chairman of the committee, when he turns his hand to organizing festivities, are expecting great things.

A full day's program has been provided, with golf as the center of attraction, lunch, a shore dinner, swimming, tennis and other amusements suited for shadier spots on the card.

Kimberly-Clark Installation Placed in McGraw Hands

HARTFORD, Conn. — The Kimberly-Clark Corporation has awarded a contract to F. H. McGraw & Company, engineers and constructors of this city for machinery installation at Memphis, Tenn. According to F. H. McGraw & Company, the Kimberly-Clark Corporation has in the past performed such mechanical installation with its own forces. This contract calls for the installation of two crepe wadding machines and auxiliaries, plus all necessary electrical, piping, sheet metal and insulation work.

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Bemis' Laminated Bags Win Dry Milk Metal

ST. LOUIS—The American Dry Milk Institute has awarded its Certificate of Approval to two types of laminated textile bags for the shipment of nonfat dry milk solids for human consumption. Bemis Bro. Bag Company, manufacturers of the bags which were approved, cooperating with the Institute, carried on extensive research work in order to develop the proper types of bags for this hard-to-pack product.

One of the bags approved is double-paperlined and is known as the Standard Type. The other is called the Triotex Type. These bags are made by laminating sturdy paper to burlap or cotton with adhesives especially selected for the purpose. Cemented seams rather than sewn seams are used in making the bags in order to provide protection against the infiltration of air and moisture. As an extra safeguard, a waxed crepe kraft liner is inserted in the bag. After the bags have been filled they are closed with Plastape. This is a heatsealing plastic-coated textile tape developed especially for this purpose by Bemis. An alternative method is to close the bags with wire ties.

Approval was received from the Packaging Committee of the American Dry Milk Institute by Bemis after rigid and exhaustive laboratory and field tests proved that these bags met all requirements for safe packaging of nonfat dry milk solids. This product is very difficult to pack due to its susceptibility to change when it comes in contact with air and moisture.

The approval of these two bags is of particular interest to the food industry inasmuch as nonfat dry milk solids are used extensively in the manufacture of bakery products, meat products, ice cream, candy, beverages, cheese and flour mixes.

These bags have been used for the past two years in increasing quantities. The economy, ease of handling and protective qualities of laminated textile bags have resulted in wide acceptance of this package by the dry milk industry.

The newly-approved bags were recently displayed by Bemis at the annual meeting of the American Dry Milk Institute in Chicago, where they attracted much attention.

Educators Attend Institute For Conservation Training

TOMAHAWK, Wis.—Wisconsin river valley educators attended the third annual conservation and forestry institute at the Trees for Tomorrow camp at Eagle River, Wis., from June 8 through June 11.

The institute is sponsored by Trees for Tomorrow, the Wisconsin State Conservation Department and the United States Forest Service and is held to provide leadership training in conservation. Field trips, panel discussions and lectures featured the program.

The 1947 committee in charge of the institute included Alfred Hornigold, Wisconsin Rapids; Steven Knezevich, Spencer; Clarence McLeod, Merrill; F. J. Schmeeckle, Stevens Point, and Clarence Wentland, Rhinelander.

American Tissue Mills Increase Wages, Holidays

HOLYOKE, Mass.—The strike peril at the Crescent St. division of American Tissue Mills has been averted with the signing of a new wage contract by management with Local 203, Pulp, Sulphite and Paper Mill Workers Union.

The contract, which runs to August, 1948, provides for a 10-cent-an-hour increase across the board to its 289 employees; an increase from three to six paid holidays; and a two-cent-an-hour boost on the shift differentials. The second shift differential goes up from four to six cents an hour and the third shift differential from six to eight cents.

The negotiations have been in progress since March 1. The workers took a strike vote in April. Judge Philip O'Brien, Benjamin F. Perkins and his son, Benjamin, Jr., negotiated for management, and William C. Lemelin, business agent of the union, headed the negotiating committee for the workers.

Paper Workers Get Increases In Consolidated Mills

SHAWINIGAN FALLS, Que. — Employees of the Consolidated Paper Corporation's mills at Three Rivers, Port Alfred, Shawinigan Falls and Grand'-Mere will receive salary increases amounting to $1,700,000 it was learned this week.

Of this figure, employees of the Belgo mill here, numbering about 800, will receive more than $300,000 — an average annual increase of $375—with minimum salary for hour employees increased from 70 to 87 cents an hour.

W. D. Mosher, manager of the Belgo mill, announced the signing of the collective agreement between plant officials and representatives of the employees, the National Syndicate of Pulp and Paper Employees.

Hebert Moving to Tonawanda

TONAWANDA, N. Y.—The Hebert Paper Specialties Company, now operating at Dexter, N. Y., has broken ground for a new plant at Tonawanda, where wax paper specialties will be manufactured. The new structure is expected to be ready for operation by August 1. Walter Herbert, president, said the factory at Dexter will be discontinued and the machinery transferred to Tonawanda.

High Water Sets Pulpwood Adrift

PORT ARTHUR, Ont. — An estimated 50,000 cords of pulpwood, valued at $1,000,000 by company officials, broke loose from booms in the Pic river about eight miles from the large Marathon Co. plant at Marathon, and is now adrift in Lake Superior.

One of the biggest breaks ever to occur, it was caused by water in the Pic river at Heron Bay rising to unprecedented heights following heavy rains in the preceding 10 days. The same rains isolated Marathon by washing out the Canadian Pacific railway tracks for about 20 miles on each side of the town.

The drifting pulpwood is not expected to be a danger to shipping as it is 70 miles from the regular shipping lanes. It moves at about a mile an hour.

A company airplane is directing the rounding up of the logs by a fleet of tugs. The danger is that an onshore wind may arise and scatter the wood over the beaches, which would mean a great loss, as it would entail a considerable cost to have the wood beachcombed.

Kimberly-Clark Association Aids Baseball Program

NEENAH, Wis. — Kimberly-Clark Activities Association has made a contribution to the city of Neenah to help pay expenses for junior baseball, which the city recreation department is sponsoring.

During the summers of 1945 and 1946, KCA sponsored a hardball program for sons of Kimberly-Clark employes, with the understanding that when the city recreation department saw fit to start a junior hardball program of its own, KCA would help the city during the first year.

KCA is promoting softball this year to the extent that it has paid fees and purchased necessary equipment for the entry of the Lakeview men's team in the Neenah city league, Kimlark men's entry in the Appleton city league, and the entry of two girls' teams, one from Main office and one from Lakeview in the Appleton city league.

U. S. Envelope Starts Its Alterations

SPRINGFIELD, Mass.—Alterations in its building here announced recently by the United States Envelope Company will get under way at once since Building Commissioner Gordon Robertson has issued the permit for the changes that will cost a total of $135,000.

Present partitions will be removed and new ones installed. New hung ceilings also are to be installed and the present walls of the building are to be finished off.

Installed 35 years ago...

..."STILL GOING STRONG"—

TALK OF THE TONAWANDAS

The 'NEWS' of Yesterday

35 YEARS AGO

The Buffalo Steam Pump Company has been awarded the contract for the pump that will be installed in the sewage lift station to be constructed on Rumbold avenue.

Reprinted from Tonawanda, N. Y. Evening News, issue of March 16.

These Buffalo Sewage Pumps, installed in 1912, are still in daily use in their original location.

Records like the above aren't just accidents. Nor are they the result of ideal pumping conditions—for "Buffalo" Pumps are "going the distance" in some of the toughest pumping jobs in industry today.

The answer lies in the OVERSIZE CONSTRUCTION of every "Buffalo" Pump. Bearings and shafts are oversize. Stuffing boxes are extra deep—to hold extra rings of packing. Pump and motor mountings are solid in every respect.

And you lose nothing in efficiency. "Buffalo" Pumps are precision-fitted for vibrationless performance.

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Newsprint Long-Term Outlook Seen Bright

TORONTO — Three important factors affecting the newsprint industry are emphasized by Gairdner & Co., in a discussion of the outlook for the industry in general and that of Great Lakes Paper Co. in particular. These factors are:

(1) Newsprint capacity has not increased, despite excess demand and increases in prices, because of the absence of additional timber limits and additional sources of power supply.

(2) The price of newsprint has increased less than the general level of commodities in the United States.

(3) The greatly improved position of newsprint companies by reason of the reduction in debt and interest charges and increases in capital.

The newsprint industry is in an entirely different position than that in the late 1920's and early 1930's; it is conservatively financed; it is much more soundly and efficiently operated; and is probably in a sounder position than at any time in its history.

After reviewing the position of Great Lakes Paper, the study states that it should have a most satisfactory long-term outlook for its products and for profitable operations.

A chart of installed newsprint capacity from 1927 to the present and a chart of the price of newsprint compared with the general price level in the United States is included in the study.

Abitibi Paper Redeems Token Preferred

MONTREAL—Abitibi Power and Paper Co. Limited, has advised the Montreal Stock Exchange that, on June 20, it will redeem the 14 outstanding 5 percent preferred shares of $100 par value, at a price of $105.62 per share.

This 5 percent "token" preferred issue was created under the 1945 reorganization plan to provide the bondholders with the means of electing seven out of the company's eleven directors. Holders of the stock would elect such seven directors, and each "A" director would hold two shares.

The stock was to become redeemable when the amount of 5 percent bonds outstanding was reduced to $25,000,000 — at the time of re-organization the amount was over $53,000,000. As the 5 percent bonds have since been redeemed (through a refunding issue of 3½'s) the company can now proceed with the redemption of the 14 preferred shares mentioned above.

Great Lakes Paper Stock Posted On Exchange

TORONTO — The Toronto Stock Exchange have posted for trading at the opening of new preference and common shares of Great Lakes Paper Co. Ltd. At the same time the old preference and common will be removed from the trading list. Basis of exchange is one new preference and two new common for one old preference and two new common for each old.

Bathurst Output Hold At Maximum

TORONTO—Operations of Bathurst Power & Paper Company Ltd., and its subsidiaries in the first quarter of 1947 have continued on a basis of "maximum output," president R. L. Weldon told Bathurst shareholders at their annual meeting here recently.

Earnings for the first quarter are not available, he said, but they are expected to show substantial improvement over the like period of last year.

Costs have risen faster than the prices of the company's products, Mr. Weldon declared, and he attributed profits to increased production and efficiency, due to plant improvements effected in the past two years.

Mr. Weldon said the company's current program of plant improvement and rehabilitation was proceeding satisfactorily though somewhat slowly.

A shareholder asked how the company would be affected by the new Quebec law against export of unprocessed pulp. Mr. Weldon said that he had no information but as the company had been operating the timber limits in Quebec for about 40 years, he felt the province would give due weight to this fact.

Wisconsin Valley Improvement Stock Issue Approved

WAUSAU, Wis.—A $25,000 par value non-voting stock issue by the Wisconsin Valley Improvement Company, whose membership is made up of Wisconsin river valley paper manufacturers and public utility operators, was approved June 10 by the Wisconsin State Public Service Commission.

FINANCIAL RECORD OF THE WEEK

New York Stock Exchange

High, Low and Last for Week Ending June 14, 1947

STOCKS

	High	Low	Last
A. P. W.	4⅛	4	4
Armstrong Cork Co.	43	38¼	42¾
Armstrong Cork Co., pf.	104	103	103⅞
Celotex Corp.	24	21⅜	24
Celotex Corp., pf.	20⅝	20¼	20⅝
Certain-Teed Products Corp.	14¾	13¼	14½
Certain-Teed Products Corp., pf.	....	....	....
Champion Paper & Fibre Co.	22¼	20½	22¾
Champion Paper & Fibre Co., pf.	105¾	104½	105
Congoleum Nairn Co.	26¾	25¼	26¼
Container Corp. of America	39¾	35	39¾
Crown Zellerbach Co.	28½	27⅝	28½
Crown Zellerbach Co., pf. 4.20	103¼	102¾	103¾
Crown Zellerbach Co., 4 pf. 4	112	110½	111
Dixie Cup Co.	27	25	27
Dixie Cup Co., A	50⅝	50½	50½
Flintkote Co.	29½	26¾	29½
Flintkote Co. pf.	105½	105½	105½
Robert Gair	6⅞	6⅛	6⅞
Robert Gair, pf.	19¼	18½	19
International Paper Co.	45⅝	41	45¼
International Paper Co., pf.	103	102¼	103
Johns Manville Corp.	41½	37¾	41½
Johns Manville Corp., pf.	114¾	112	114¾
Kimberly-Clark Corp.	23⅜	22¼	23⅛
Kimberly-Clark Corp., pf.	107	106	107
Mac Andrews & Forbes	35	34½	34½
Mac Andrews & Forbes, pf.	....	....	....
Marathon Corp.	22¼	20	22¼
Mead Corp.	18¾	17¼	18¼
Mead Corp., pf. 4¼	93	92⅜	93
Mead Corp., pf. 2	....	....	....
National Container Corp.	39¼	36½	38¾
Paraffine Companies, Inc.	64	58½	64
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	21¼	19¾	21⅛
Rayonier, Inc., pf.	37¾	35½	37¾
Ruberoid Co.	49	45½	48
Scott Paper Co.	45	43	45
Scott Paper Co., pf.	99½	99½	99½
Sutherland Paper Co.	38¾	38¾	38¾
Union Bag & Paper Corp.	31⅝	28⅝	31⅝
United Paperboard Co.	15	14¾	15
U. S. Gypsum Co.	101	95	101
U. S. Gypsum Co., pf.	....	....	....
West Virginia Pulp & Paper Co.	41	38⅛	40½
West Virginia Pulp & Paper Co., pf.	111	110½	111

BONDS

Abitibi Pulp & Paper Co., 5s '53	....	....	....
Celotex Corp., 3¼s '60	....	....	....
Certain-Teed Products Corp., 5½s '53	....	....	....
Champion Paper & Fibre Co., 3s '65	103½	103½	103½
Mead Corp., 3s '66	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending June 14, 1947

STOCKS

	High	Low	Last
Great Northern Paper Co.	42	41¾	42
Hummel Ross Fibre Corp.	....	....	....
St. Regis Paper Co.	9⅛	8⅝	9⅛
Taggart Corp.	8⅛	8¼	8¼

BONDS

American Writing Paper Co., 6s '61	....	....	....

STOP WHISPERING! Too many people can hear you

LET'S GET ONE THING STRAIGHT: This company is *not* going out of business!

On the contrary, we're all set right now to meet all comers in the engineering, production, installation, and servicing of the custom-built machinery that we have made for more than 62 years for the paper-making and allied industries.

Our engineering ability was never greater . . . our manufacturing facilities were never better . . . and our employees were never so enthusiastic.

What's more, we're all set to make anyone else step to keep up with us on deliveries.

Surprised? *We* weren't; for we knew that new management can be a strong tonic when the reputation of the company it takes over is apparently invulnerable. You're going to hear a lot about us from now on—not from the whispered gossip of others, but from the deliberate shouting we'll do about ourselves. You're going to like what you hear, too.

The one thing that has helped as much as anything else to give us a new lease on life has been the well wishes and loyal support of our hundreds of fine old customers.

The MOORE & WHITE Company 15TH STREET AND LEHIGH AVENUE • PHILADELPHIA 32, PA.

CUSTOM BUILDERS OF MACHINERY FOR PAPER MAKERS

Bagley-Sewell Buys Norwood Assets

NORTHAMPTON, Mass. — A compromise settlement of the tangled legal affairs of the Norwood Engineering Co., makers of paper-making machinery, has been approved by Bankruptcy Referee Walter L. Stevens, under which the Bagley & Sewell Co., of Watertown, N. Y., paper-making machinery manufacturers, will take title to all the assets of the Norwood concern and reopen the plant which has been closed down since last summer, it has been disclosed by Atty. Luke F. Ryan, trustee in bankruptcy of the Norwood company. In all probability, the entire deal will be consummated within a month.

The court order, signed by Referee Stevens, indicates that the new owners will pay $135,000 in cash for all the real and personal property, formerly owned by the Norwood Engineering Co., including land, buildings, machinery, equipment, material, inventory, patterns, patents, excepting a few small accounts receivable, and a small amount of property claimed by the Norwood Filtration Co.

Out of the purchase price, the Krock Brothers of Worcester are to receive $91,000 in satisfaction of their claims totaling $118,000, consisting of $21,000 paid in May, 1946, to the assignee for the benefit of creditors; $25,000 worth of new machinery installed since last May, and $72,500 worth of first and second mortgage bonds. The balance of the funds received by the trustee is to be used to discharge the remaining first mortgage bonds, for administration expenses and dividends to the general creditors.

Not consigned in the present arrangements, and yet to be settled, are the disposition of several large claims against the bankrupt, which are disputed by the trustee. It is understood that these will be tried and a decision rendered about them by Referee Stevens in the near future.

Trustee Ryan stated that "a compromise agreement was made possible only with the active cooperation of Aaron and Edward Krock of Worcester, the Norwood Filtration Co., and Beatrice I. Hartmann of this city, as well as the Westinghouse Electric Corp., of Pittsburgh, Pa., and the Bagley & Sewell Co., all of whom, together with myself as trustee, were parties to the various suits pending in the Superior Court involving the bankrupt's assets."

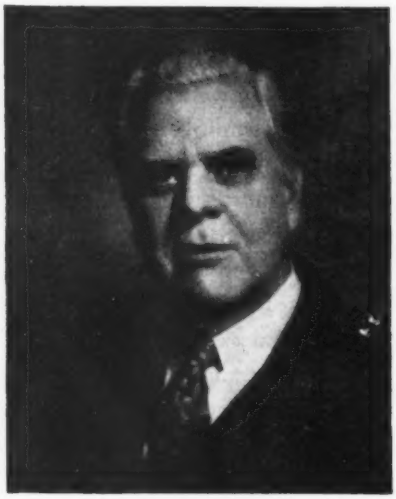
Kinsey Succeeds Wilshusen As Cameron President

BROOKLYN, N. Y.—W. B. Wilshusen, who has been president of the Cameron Machine Company since the decease of the founder, James A. Cameron, in 1933, has retired from that post. He has been with the company for thirty-two years, successively as advertising manager, sales manager and secretary, and will continue his association with the company as its state representative in California, where he will make his home.

W. B. WILSHUSEN
Retires as Cameron head

H. C. Kinsey, a director for twenty years and in recent years vice-president, has been elected to the post of president. A. Stirba, Sr., works manager and director for twenty-five years, has been elected vice-president. R. W. Cummings, service manager for eighteen years, has been elected secretary.

Two new members have been elected to the board of directors: Joseph Scheuermann, well known in the trade, who has been with the company over twenty years, more recently as sales manager, and Palmer J. Lathrop, plant manager and assistant vice-president of Bristol-Myers Company.



H. C. KINSEY
Succeeds Wilshusen

Negotiators Agree on Worthington Scale

HOLYOKE, Mass.—In the presence of a federal conciliator, representatives of labor and management in the Holyoke works of Worthington Pump and Machinery Corp., this week agreed on a new contract, providing for wage raises and other improvements.

The settlement is subject to approval by Worthington members of Local 259, United Electrical, Radio and Machine Workers of America, CIO. Frank Harris, conciliator of the U. S. Department of Labor, attended the final conference.

The wage increases are in line with the so-called package raise of 15 cents an hour which has become the pattern of the industry, according to Leon Masse, business agent of the union.

The settlement, involving approximately 900 workers, is retroactive to May 15, expiration date of the old contract. Piece workers are to get a 12-cent hourly raise on the basis of a 75-unit hour under the company's incentive system. This, Masse explained, will work out at almost 16 cents an hour based on the shop average of the past 12 months under the incentive system. Day workers are raised from 12 cents an hour to 17, with establishment of $1.02 as the minimum for unskilled labor.

The disputed vacation pay issue was settled as follows: 20 hours' paid vacation for workers employed from six months to one year; two per cent of the previous calendar year's pay for those employed a year or more, and four per cent for those with five years' employment. A further financial concession is a raise in the second shift premium from five cents an hour to seven.

Dalton Increases Wages At Crane and Weston

DALTON, Mass.—A wage increase of 10 cents per hour for approximately 1000 employees in the mills of Dalton's two paper manufacturers, Crane & Company and the Byron Weston Company, has been announced. The increase became effective immediately.

Stein Confined to Hospital

LAWRENCE, Mass.—Norman J. Stein, treasurer of the Merrimac Paper Company, Inc., is confined in the Peter Bent Brigham Hospital, Boston, with a serious illness and is not expected to return to his duties for approximately three weeks.

E. G. Murray Recovering

CHICAGO—E. G. Murray, St. Regis Paper Company executive who was seriously burned in a Chicago hotel fire a few weeks ago, is reported to be rapidly improving. He is in Henrotin Hospital, Chicago.

Designers put this project on an Economical Permanent Footing with

KOPPERS
PRESSURE-CREOSOTED PILES

A common problem—providing a firm, *enduring* foundation in unstable soils—faced the designers of this large industrial building. To solve it, they chose a pile material whose permanence and economy have been conclusively demonstrated in thousands of applications—pressure-creosoted wood.

Koppers Pressure-creosoted piles were driven in the wall trench, and under the floor area. These multiple supports eliminate settling hazards. The treatment gives enduring protection against decay, permitting cut-offs above the water table to be safely made. It also fortifies the piles against insect attack.

The *permanence* of pressure-creosoted piles is demonstrated by the old buildings founded on them . . . and present-day *economy and effectiveness* are indicated by the many modern buildings that use this proven method of overcoming soil handicaps. Koppers Pressure-creosoted piles permit economical development of areas where water tables are below pile cut-offs. They provide adequate bearing value in constructing foundations for heavy bridges or machinery. And they are an accepted means of equalizing support when part of the building is over filled or soft ground.

Koppers is equipped to treat piles up to 125 feet in length, and the delivery situation is excellent. If you have a foundation problem, get in touch with Koppers.

Piles in trench will be capped by wall; others by floor slab.

Reinforcing rods for floor slab. Piles can be seen below.

Floor partially poured. Lower reinforcing is covered.

KOPPERS PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.

PITTSBURGH 19, PENNSYLVANIA

Timken Argues Water Problem Is Economic, Not Bureaucratic

WASHINGTON, D. C.—Strong protests were entered late last week on behalf of the pulp and paper industry by E. W. Tinker, who presented a brief for the American Paper and Pulp Association against proposed stream regulatory bills. Appearing before the House Public Works Committee in session to consider legislation that would provide top powers of regulation in the office of the Surgeon General, Mr. Tinker argued strongly that this office would exercise arbitrary authority without consideration of economic conditions; that by being empowered to stop manufacturing which it deemed against public health it could in fact close down whole economic areas. Better, he argued, to leave such regulation to state authorities which, being closer to the scene of the problem also could more intelligently weigh the various factors in it.

"It seems to us," said Mr. Tinker, that for the Congress to pass such legislation would amount to giving the Surgeon General a blank check of authority to determine where and under what conditions any new unit of industry, no mater how small, that would discharge waste into any stream might be started, or whether it could be started at all. The states' authorities would, in effect, have only such authority as the Surgeon General's regulations might permit. We do not believe this provision is desirable or workable. And we are opposed to extensions of this nature of federal over state authority.

"The pulp and paper industry is in the business of producing essential commodities. It is highly competitive and it is in the public interest that it produce the best possible products at the least possible cost. There is no uniform return on investment. What one mill may be able to do at a profit in control and utilization of waste might spell financial loss to another less fortunately situated. As earlier stated, both the necessity for and the possibility of waste control varies with every individual plant. But the importance of the plants as employers of labor, purchasers of raw materials and producers of essential commodities does not vary. No standard general rules can be drawn. Problems have to be worked out in a spirit of understanding and cooperation. We do not believe that it would be in the public interest to substitute federal for state authority or to, in any way, impose federal authority over state authority, except in cases where the states themselves petition the federal government for administrative assistance.

"The pulp industry, and to a large extent the paper industry, is typically a small town industry. The forests are the back country of America, and pulp and paper mills, like saw mills and other wood manufacturing industries, are generally found in small communities, many of which have been created by and depend on the operation of a single plant for their economic existence.

"A second controlling factor, very much more arbitrary than wood supply, is that of water supply. Pulp and paper mills must have a tremendous quantity of clean usable water. Along with the 55,000 cords of wood that were ground and cooked daily into pulp and converted into 62,000 tons of paper and paperboard in 1946, some three billions of gallons of water were used daily in processing the raw materials through to the manufactured products. This water was, of course, not consumed; most of it was discharged to find its way back into the open water or nearby streams. It, necessarily, carries waste materials that are picked up during the manufacturing process. Chemists have discovered ways to use some of the waste materials in the production of usable by-products, and the industry has developed processes through which the laboratory discoveries can be adapted to economic production. There are other waste materials that the chemists have as yet found no way to control, or as to which the expense of control is not economically feasible. In other words, there are wastes as to which choice has to be made between some stream pollution and discontinuance of the manufacturing plant. The problem of stream pollution control lies between these two extremes and it is never the same as to any two pulp and paper mills and any two streams.

"It is hardly necessary to say that the management of any industrial plant would prefer not to pollute the stream into which its effluent is discharged, or that it would prefer to recover from the water used in its manufacturing process all waste that can be used in the economic production of any salable by-product. To that end the pulp and paper industry, through its individual mills and by cooperative effort, has spent millions of dollars in an effort to abate the nuisance of stream pollution. As evidence of the industry's efforts, I call the Committee's attention to the fact that in 1943 the industry organized the National Council for Stream Improvement, which sponsors and finances research fellowships in ten universities scattered all over the country. In addition, the staff carries on a continuing review of current technical and economic developments in the field of stream improvement, and is constantly visiting the mills to review and consult with them about their abatement and other problems. Every effort is made to enlist the interest and support of appropriate public agencies. The extent and nature of the Council's service are well illustrated in its report for 1946, a copy of which I would like to proffer as an exhibit.

"As of December 31, 1946, the Council's membership consisted of 172 companies operating 302 pulp and paper mills, representing approximately 85 per cent of the pulp, paper and paperboard production of the United States. The primary function of the National Council is to conduct research looking to the solution of the industry's waste abatement and utilization problems and to make the research findings applicable to actual mill operation. The paper and pulp industry is spending this year approximately $250,000.00 in an organized effort towards stream improvement.

"With reference to the bills that the Committee has before it, the industry recognizes that there is a national interest in stream pollution. There is a national interest in just about everything that affects the welfare of individual citizens or individual units of manufacture or trade throughout the country. The Congress has recognized that interest through the passage of numerous enabling acts and the appropriation of funds for research and for cooperation with the states in their efforts to bring about a satisfactory situation. In extreme situations, where the states were not able to deal with the problem within their borders or it was not possible to solve them through inter-state compacts, the Congress has made provision for direct federal, corporate regulation,—but, when the necessity for that is not clearly evident and federal control not clearly workable, we believe that the federal government should restrict its activity to research and guidance and, if necessary, financial assistance, leaving enforcement to state authorities."

Buffum Predicts Rise In De-Inked Output

NEW YORK — Newsprint production from de-inked paper is expected to reach a total of 100,000 a year within the next few years by F. B. Oldham who recently turned over patents on a process for this work to Buffum and Company. Present production, Mr. Oldham estimated, runs 30 tons daily.

Mr. Oldham said this expansion would entail the building of "four or five new mills throughout the United States near the largest cities." Cooke Coen and Frank J. Buffum are now using the process at the Sheffield paper plant at Saugerties, N. Y., and have incorporated a company in Delaware to act as a parent concern in building and operating additional plants.

It is understood that no stock in the new concern will be sold publicly but that licenses will be sold to use the process and the proposed plants will be financed by Buffum & Company.

FOUR PHASE SLIME CONTROL

Experience has shown that no one chemical will eliminate slime in all paper mills. Research indicates there are four distinct causes of slime formation.

Our proven, mill-tested, products effectively eliminate these four sources of slime.

A new brochure, "Slime Control in Paper Mills," describes the latest developments in this field and shows how easily, effectively and economically Four Phase Slime Control can be applied in your mill. Our Technical Staff is at your service.

GENERAL DYESTUFF CORPORATION
435 HUDSON STREET • NEW YORK 14, NEW YORK
BOSTON • CHARLOTTE • CHICAGO • PHILADELPHIA • PROVIDENCE • SAN FRANCISCO

Boulware Takes Over G-E Labor Relations

NEW YORK, N. Y. — Responsibility for General Electric Company policy pertaining to employe relations has been assigned to L. R. Boulware, a vice-president of the company, it was announced today by Charles E. Wilson, G-E president.

E. D. Spicer, vice-president formerly charged with this responsibility in the organization, will henceforth be in charge of the company's manufacturing policy, continuing as a member of the president's staff.

Mr. Bouleware, who was elected a G-E vice-president in November, 1945, has previously been in charge of the operations of the nine manufacturing affiliates of G-E. His headquarters will be in New York. Prior to his association with the company, he had successively been general sales manager of the Easy Washing Machine Co., vice-president and general manager of the Carrier Corp., and vice-president and general manager of Celotex Corp. During the war, he was operations vice-chairman of the War Production Board, and at various times during his career has been a teacher, factory manager, purchasing agent and comptroller. Responsibility for the activities of affiliated manufacturing companies, relinquished by Mr. Boulware, has temporarily been assigned to Ralph J. Cordiner, vice-president and assistant to the president.

Mr. Spicer, making his headquarters in Schenectady, will not only be in charge of manufacturing policy but will also be responsible for the coordination of matters relating to the training and transfer of all manufacturing personnel between company activities. He has been a member of the General Electric organization since 1924, and a vice-president since 1941. Mr. Spicer's long experience in the manufacturing and production field field began with his own company prior to joining General Electric. He had served G-E as superintendent of various manufacturing divisions at Schenectady, as assistant works manager and then works manager at that largest of the company's plants, before being elected a vice-president.

Canadian Wallpaper Nets $1.51 Per Share

TORONTO — Net profit of Canadian Wallpaper Manufacturing Ltd. for the year ended April 30 amounted to $195,395, after all charges, including $100,000 contingency reserve against expansion plans in 1947, and is equal to $1.51 a share. This compares with $185,073 for the previous fiscal year, equal to $1.43 a share. Balance sheet shows net working capital of $1,584,085, compared with $1,752,136 the year previous.

Congress Opens Paper Bids For Third Quarter Purchase

M. & O. Paper Quarter Shows Net Up 140 Per Cent

TORONTO—A very sharp increase in sales and net profits of Minnesota & Ontario Paper Co. was recorded for the first quarter of 1947 as compared with the same period in 1946—resulting from increased sales and higher prices. It was announced at the annual meeting at Minneapolis that net sales for the 1947 quarter amounted to $11,585,710, compared with $6,879,918 for the first quarter of 1946.

Net income, after provision for income taxes and other reserves, amounted to $1,206,473, which was over 2.4 times the net shown for the first quarter of 1946 of $495,319. This represented 93 cents per share, compared with 37 cents.

The statement for the past year indicated net income of $1,125,490 or 82 cents per share in the final quarter.

White-Wyckoff Heads Are Foremen's Guests

HOLYOKE, Mass.—The June meeting of the Foremen's Club of the White & Wyckoff Manufacturing Company was held recently at the Hotel Roger Smith.

William Daunheimer, president, was in charge of the meeting, and Bert Grady, foreman of the papeterie department, was program chairman. George F. McKenna, manager of the greeting card department, told of the history of the development of the greeting cards of the company and some of the problems of production with plans for the future.

Guests from the management included Harry C. Dutton, president; Edward P. White, treasurer; A. H. Sampson, assistant treasurer; L. M. Benemelis, superintendent; and Charles F. Gillette, production manager, greeting card department.

All of the foremen and foreladies of White & Wyckoff were present, the membership including: Arthur Beaupre, die-stamping department; Edward Berneche, box-making; William Daunheimer, stationery filling; Edward Driscoll, stock and shipping; Miss Mary Frodyma, stationery samples; Herbert Gray, papeterie manufacturing; Patrick Herbert, Stokes and Smith Automatic box wrapping; Herman Mekler, raw stock materials; Miss Marie Racine, greeting card samples; Walter Stober, printing department; Edward Stroshine, machine folding; John Tierney, greeting card assembling; Everett Walsh, maintenance engineer, and Fernand Dube, time study man.

WASHINGTON — Bids were received Monday by the Joint Congressional Committee on Printing for paper for the use of the Government Printing Office for a three months' period beginning July 1. Awards are to be announced next week. The bids were as follows:

Newsprint

No. 1—200,000 lbs., 24x36—64; rolls, 19, 24, 36, and 48 ins. wide (3-inch fiber cores). Weight of cores and wrappers shall be included in net weight.

Machine-Finish Book

No. 3—250,00 lbs., 25x38—70; flat, cut any size, min. 21 ins., max. 48 ins.
Mudge Paper Co. (100,00 lbs. only) .. 10.71c

No. 4—175,000 lbs., 25x38—70; flat, cut 24x38, 28x38, and 38x48 ins.
Barton, Duer & Koch Paper Co. 10.43c
Mudge Paper Co. (50,000 lbs. only) .. 10.71c

No. 5—175,000 lbs., 25x38—70; flat, cut 24x38, 28x38, and 38x48 ins.
Mudge Paper Co. (50,000 lbs. only) .. 10.71c

No. 7—175,000 lbs., 25x38—70; rolls, 19 and 38 ins. wide (3-inch fiber cores).
Barton, Duer & Koch Paper Co. 9.59c
Mudge Paper Co. 9.87c
Mead Sales Co. 9.60c

No. 8—175,000 lbs., 25x38—70; rolls, 19 and 38 ins. wide (3-inch fiber cores).
Mudge Paper Co. 9.87c
Mead Sales Co. 9.60c

No. 10—100,000 lbs., English finish, 25x38—90; flat, cut any size, min. width 24 ins., max. width 48 ins.

Machine-Finish Book End Paper

No. 18—40,000 lbs., 25x38—160; flat, cut 38x50 ins., the grain to run the 38-inch way.
Mead Sales Co. 9.56c

Offset Book

No. 19—100,000 lbs., 25x38—80; flat, cut any size, min. width 24 ins., max. width 48 ins., the grain to run lengthwise of the sheet.

No. 20—400,000 lbs., 25x38—100; flat, cut any size, min. width 24 ins., max. width 48 ins., the grain to run lengthwise of the sheet.

Offset Poster

No. 21—40,000 lbs., 25x38—120; flat, cut any size, min. width 24 ins., max. width 48 ins., to run lengthwise of the sheet.

Antique Book

No. 22—50,000 lbs., 25x38—90 and 120; flat, cut 32x42, 33x43, and 38x50 ins.
Mead Sales Co. (120 pound basis) 9.56c

Supercalendered Book

No. 33—200,000 lbs., 25x38—90; flat, cut any size, min. width 24 ins., max. width 48 ins.
R. P. Andrews Paper Co. 9.38c

Coated Book

No. 37—700,000 lbs., 25x38—100; flat, cut any size, min. width 24 ins., max. width 48 ins.
Barton, Duer & Koch Paper Co. 11.07c

No. 39—200,000 lbs., 25x38—100 and 120; rolls, 28½ and 38 ins. wide. (3-inch fiber cores).

Barton, Duer & Koch Paper Co. (100 pound basis) 9.96c
Barton, Duer & Koch Paper Co. (120 pound basis) 9.27c
Mead Sales Co. (100 pound basis) 9.66c
Mead Sales Co. (120 pound basis) 8.98c

No. 40—150,000 lbs., 25x38—140; flat, cut 32x42, 38x48, 39x50, and 41x52 ins.; the grain to run lengthwise of the sheet.

Consolidated Water Power & Paper Co.) 10.254c

Chemical Wood Mimeographed, White and Colored

No. 46—40,000 lbs., blue, buff, green, pink, and yellow, No. 40; flat, cut 32½x42½ and 38x48½ ins. Grains: Size 32½x42½ to run the 42½ in. way; size 38x48½ to run the 38 in. way. Min. order, one color, 10,000 lbs.

Duplicator Copy Paper, Liquid Process, White and Colored

No. 49—40,000 lbs., pink, yellow, green and blue, No. 40; flat, cut 32x42 and 34x44 ins.; the grain to run lengthwise of the sheet.

Blue U S M O Safety Writing

No. 50—500,000 lbs., No. 32; rolls, 22 ins. wide, 24 ins. in diameter (3-inch fiber cores).

Paper Corp. of U. S. (100,00 lbs. only) 19.89c
R. P. Andrews Paper Co. (100,00 lbs. only) 18.27c
D. L. Ward Co. (250,00 lbs. only—price at time of shipment) 17.85c
....p8..6...j..

Chemical Wood Writing, White and Colored

No. 52—100,000 lbs., white, No. 26; flat, cut any size, min. width 21 ins., max. width 48 ins.

Stanford Paper Co. (Price prevailing at time of shipment) ..... ——

No. 53—3,000,000 lbs., white, No. 32; flat, cut any size, min. width 21 ins., max. width 48 ins.

R. P. Andrews Paper Co. (1,000,000 lbs. only) 10.09c
D. L. Ward Co. (Price prevailing at time of shipment) 11.98c
Cauthorne Paper Co. (100,000 lbs. only. Price prevailing at time of shipment) 11.50c

No. 54—4,500,000 lbs., white, No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.

R. P. Andrews Paper Co. (200,000 pounds only) 9.51c

No. 55—100,000 lbs., white, No. 32; rolls, min. width 16 ins., max. width, 48 ins. (3-inch fiber cores).

R. P. Andrews Paper Co. (100,000 pounds only) 9.07c
Mead Sales Co. 9.71c
Cauthorne Paper Co. (100,000 pounds only. Price prevailing at time of shipment) 11.50c

No. 56—300,000 lbs., white, No. 40; rolls, min. width 16 ins., max. width 48 ins. (3-inch fiber cores).

R. P. Andrews Paper Co. (300,00 pounds only) 8.48c
Mead Sales Co. (150,000 pounds only) 9.13c

No. 58—400,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, Nos. 32 and 40; flat, cut any size, min. width 21 ins., max. width 48 ins. Min. order, one color, 10,000 lbs.

Chemical Wood, Writing (Titanium Dioxide Filled)

No. 61—250,000 lbs., No. 32; flat, cut 34x44 ins.

Barton, Duer & Koch Paper Co. 11.69c

50% Lithograph-Finish Map

No. 64—50,000 lbs., Nos. 32 and 40; flat, cut any size, min. width 22 ins., max. width 48 ins., the grain to run lengthwise of the sheet.

Paper Corp. of U. S. 21.15c
Howard Paper Mills Div., Aetna Paper Co. (No. 32) 20.51c
Howard Paper Mills Div., Aetna Paper Co. (No. 40) 19.54c
Mead Sales Co. 23.50c

High Wet Strength Map

No. 68—100,000 lbs., No. 48; flat, cut any size, min. width 22 ins., max. width 48 ins.; grain to run lengthwise of the sheet.

Chemical Wood, Manifold, White and Colored

No. 74—40,00 lbs., blue, buff, cherry, green, pink, salmon, and yellow, No. 18; flat, cut 28x34, 32x42, and 34x44 ins.; min. order, one color, 5,000 lbs.

Old Dominion Paper Co. 19.947c
Frank Parsons Paper Co. (Minimum order 5,000 lbs. blue, pink, green, yellow; 20,000 lbs. buff, salmon. Cherry not available—will supply pink instead) 17.38c

50% Manifold White and Colored

No. 75—20,000 lbs., white, No. 14; flat, cut 32x42 ins. Min. order, 5,000 lbs.

Barton, Duer & Koch Paper Co. 35.00c
R. P. Andrews Paper Co. 38.05c

No. 78—20,000 lbs., blue, buff, cherry, green, pink, salmon and yellow. No. 18; flat, cut 28x34 and 34x44 ins. Min. order, one color, 5,000 lbs.

Old Dominion Paper Co. (Price prevailing at shipment) 31.238c
Barton, Duer & Koch Paper Co. 32.00c
Paper Corp. of U. S. (Not less than 5 tons of a color) 32.75c
R. P. Andrews Paper Co. 31.02c

50% White Glazed Manifold

No. 85—50,000 lbs., No. 16; flat, cut 32x42 ins. Min. order, 20,000 lbs.

Barton, Duer & Koch Paper Co. 34.50c

Chemical Wood Bond, White and Colored

No. 102—300,000 lbs., white, No. 40; flat, cut any size, min. width 21 ins., max. width 38 ins.

25% Bond, White and Colored

No. 105—100,000 lbs., white, No. 26; flat, cut any size, min. width 21 ins., max. width 48 ins.

Barton, Duer & Koch Paper Co. 22.95c
Howard Paper Mills Div., Aetna Paper Co. 22.19c

No. 106—100,000 lbs., white, No. 32; flat, cut any size, min. width 21 ins., max. width 48 ins.

Barton, Duer & Koch Paper Co. 18.65c
Howard Paper Mills Div., Aetna Paper Co. 18.04c

No. 107—100,000 lbs., No. 32; flat, cut any size, min. width 21 ins., max. width 48 ins.

Howard Paper Mills Div., Aetna Paper Co. 18.04c

No. 109—50,000 lbs., No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.

Howard Paper Mills Div., Aetna Paper Co. 17.08c

No. 113—100,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 32; flat, cut any size, min. width 21 ins., max. width 48 ins.

Howard Paper Mills Div., Aetna Paper Co. 18.74c

No. 114—100,00 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.

Howard Paper Mills Div., Aetna Paper Co. 17.79c

100% White Bond

No. 128—15,000 lbs., white, Nos. 32 and 40; flat, cut any size, min. width 16 ins., max. width 38 ins., minimum order, one substance, 2,000 lbs.

Old Dominion Paper Co. 34.748c
Barton, Duer & Koch Paper Co. No. 32) 34.15c
Barton, Duer & Koch Paper Co. No. 40) 33.17c
R. P. Andrews Paper Co. (No. 32) . 33.32c
R. P. Andrews Paper Co. (No. 40) .. 32.35c

Chemical Wood White Ledger

No. 150—80,000 lbs., No. 48; flat, cut any size, min. width 17 ins., max. width 48 ins.

No. 151—100,000 lbs., No. 64; flat, cut any size, min. width 17 ins., max. width 48 ins.

No. 153—40,000 lbs., white, No. 88; flat, cut any size, min. width 17 ins., max. width 48 ins.

25% Ledger, White and Colored

No. 154—80,000 lbs., white, No. 48; flat, cut 28x34, 32x42, 34x44 and 38x48 ins. Min. order, one color, 5,000 lbs.

Howard Paper Mills Div., Aetna Paper Co. 18.04c

No. 157—40,000 lbs., blue, buff, cherry, green, pink, salmon, and yellow, No. 88; flat, cut 34x44 ins., min. order, one color, 5,000 lbs.

Howard Paper Mills 18.74c

Chemical Wood White and Colored Index

No. 183—300,000 lbs., white, 25½x30½—220 and 280; flat, cut 34x44 ins., with projecting colored-paper marker between each 100 sheets. Min. order, one weight, 10,000 lbs.

50% Index, White and Colored

No. 191—200,000 lbs., blue, buff, cherry, fawn, green, pink, salmon and yellow; 25½x30½—220 and 280; flat, cut 34x44 ins., with projecting colored-paper marker between each 100 sheets. Min. order, one color, one weight, 5,000 lbs.

Barton, Duer & Koch Paper Co. 21.70c
Paper Corp. of U. S. 21.24c
R. P. Andrews Paper Co. (220 pound weight only and 100,000 pounds only) 20.95c
Howard Paper Mills Div., Aetna Paper Co. 19.14c
Collins Manufacturing Co. 21.44c

Cloth Lined Cover, White and Colored

No. 205—45,000 sheets, 20x26—136; white, brown and quaker drab; flat, cut 36x38 ins.

Wood Manila

No. 208—80,000 lbs., 24x36—80 and 100; flat, cut 25x38, 32x42 ins., with projecting colored-paper marker between each 500 sheets.

No. 2 Kraft

No. 217—50,000 lbs., 24x36—80 to 160; flat, cut any size, in wrapped bundles.

No. 218—80,000 lbs., 24x36—80 to 160; cut any size, folded (25 sheets per fold), in wrapped bundles.

No. 219—40,000 lbs., 24x36—80 to 160; rolls, min. width 9 ins., max. width 48 ins., wound on wooden plugs, 1½ inch hole, or on 3-inch fiber cores as may be specified.

INTERESTING FACTS ABOUT PAPER

The Moors who overran Spain in the Eighth Century were the first people in Europe to establish a paper industry. Their paper was of the *Oriental* type, possessing great strength and durability.

INTERESTING FACTS ABOUT GREEN MX CONC.

Green MX Conc. is one of the strongest tinctorial basic colors. Possessing little light fastness but great strength and brilliancy, it is often used to brighten direct and acid colors. It is extensively used in beater dyed tissues, wrappers, boxboard, poster, news, catalog and specialties—in short, wherever an economical green is required.

Your Calco representative will be glad to supply you with full information on Green MX Conc.

Calco

CALCO CHEMICAL DIVISION
Heller & Merz Department

AMERICAN CYANAMID COMPANY
Bound Brook, New Jersey

New York • Chicago • Boston • Philadelphia • Charlotte • Providence

White Gummed

No. 252—200,000 sheets, No. 40; flat, cut 22x34 ins., min. order 25,000 sheets.

No. 265—5,000 lbs., 24x36—320; flat, cut 38x48 ins., in wrapped bundles; min. order, 5,000 lbs.

Paper Corp. of U. S. (Price at time of shipment)	14.52c
R. P. Andrews Paper Co.	12.16c

Railroad Board, White and Colored High-Finish Red Sulphite

No. 305—10,000 sheets, buff, flat, 22x28 ins., 14-ply, each 50 sheets fully banded. Min. order, 5,000 sheets.

Old Dominion Paper Co. (Per M sheets. Price at shipment)	$84.738
Barton, Duer & Koch Paper Co. (Per M sheets)	$86.73
Stanford Paper Co. (Per M sheets)	$86.73

Wood Cardboard, Colored

No. 308—20,000 lbs., blue, buff, gray, green, melon, pink, and yellow; 22½x28½—184; rolls, 20 ins. wide (3-inch fiber cores).

No. 309—20,000 lbs., blue, buff, gray, green, melon, pink and yellow; 22½x28½—184; rolls, 20 inches wide (3-inch fiber cores).

Chemical Wood Tan Board

No. 310—50,000 lbs., 22½x28½—200; flat, cut 19½x28½, 25x38 and 34x44 ins.

Paper Corp. of U. S. (Price at time of shipment)	15.00c
R. P. Andrews Paper Co.	13.49c

United States Postal Card Paper

No. 325—2,000,000 lbs., 22½x28½—188; rolls, 33 ins. wide, 36 ins. in diameter (6-inch iron or fiber cores).

Whitaker Paper Co. (Total tonnage 2,500,000 on lots 325, 326 and 327)	7.67c
R. P. Andrews Paper Co. (Total tonnage 2,000,000 on lots 325, 326 and 327)	7.55c

No. 326—2,000,000 lbs., 22½x28½—188; rolls, 33 ins. wide, 36 ins. in diameter (6-inch iron or fiber cores).

Whitaker Paper Co. (Total tonnage 2,500,000 on lots 325, 326 and 327)	7.67c
R. P. Andrews Paper Co. (Total tonnage 2,000,000 on lots 325, 326 and 327)	7.55c

No. 327—1,000,000 lbs., 22½x28½—188; rolls, 33 ins. wide, and 36 ins. in diameter (6-inch iron or fiber cores).

Whitaker Paper Co. (Total tonnage 2,500,000 on lots 325, 326 and 327)	7.67c
R. P. Andrews Paper Co. (Total tonnage 2,000,000 on lots 325, 326 and 327)	7.55c

Forestry Service Buys Launch

VANCOUVER, B. C.—B. C. Forestry Branch of the British Columbia Department of Lands has purchased the 40 foot power boat Tahuna III. The boat, built by J. T. Taylor of Vancouver in 1945, will be renamed and will be stationed at the Forest Service Marine station at the mouth of the Fraser River.

Riegel Sales Rise

NEW YORK—Net sales of the Riegel Paper Corporation for the sixteen weeks ended April 22, were reported at $7,168,171, against $5,953,778 for the corresponding period a year ago. Net profits were reported at $387,831 this year against $400,514 for the earlier period.

Predicts Less Pulp To Come From Sweden

NEW YORK—Christian Kaijser, who arrived in this country recently to seek equipment for the large Tegefors paper mill at Jarpen, Sweden, said in an interview that shortages of fuel, labor and chemicals would limit total Swedish pulp output this year to 1,500,000 tons, against the 2,500,000 tons produced ten years ago.

Sweden's imports of coal and coke, he pointed out, are only one-half the amount received in 1937. This means that more wood must be reserved for heating purposes today than was used for pulp production in 1937. Easily accessible forests, he added, were overcut during the war, and the lack of man power prevents exploitation of less accessible forests.

As much as 50 percent of the woods labor force, he estimated, has been diverted from pulp to cutting firewood, as the acute fuel shortage has given firewood a priority status over pulp. Four mills with an output of 100,000 tons were dismantled last year, he disclosed, because of the labor and materials shortages. One plant, he said, was shipped to Yugoslavia, while others were scrapped.

Another 100,000 tons capacity, he said, probably will be scrapped shortly, and only the availability of American capital has prevented the dismantling and shipping out of Sweden of the Tegefors mill. This capital was provided by Lawrence Lesavoy, president of Paper Corp. of America, and a group of other manufacturing concerns which operate abroad through Lesavoy International. Along with 75,000 acres of woods, Mr. Lesavoy took over the Tegefors mill last month. He plans to modernize the plant and substantially increase its present daily output of 100 tons of alpha pulp.

As one means of overcoming the pulpwood shortage, Mr. Kaijser said, experiments are well advanced on the use of birch and poplar as substitutes for spruce and pine. The former, he pointed out, grow more rapidly. Meanwhile, he said, Sweden is rationed on paper to the extent that an additional 100,000 tons may move into export channels.

When the fuel and labor situation eases, he said, pulp production may increase from 1,500,000 tons to a total of 2,000,000 tons. But the reduction in output from pre-war levels, he added, may result in the maintenance of high price levels for a number of years.

While Russia has taken over several Finnish mills, he said, it will probably be ten years or more before the Soviet republics become a serious factor in the world pulp market. The Swedish-Russian trade agreement, he said, apparently has not caused any special economic difficulties for Sweden except that electrical equipment production may be set back two years.

Add Directors To St. Lawrence Group

TORONTO—St. Lawrence Corporation and its subsidiaries — St. Lawrence Paper Mills Company, Lake St. John Power & Paper Company, and Brompton Pulp and Paper Company — each have increased the number of its directors at special general meetings.

This implemented the arrangement announced just prior to the annual meeting of the parent company, which terminated a long proxy fight between the management and a group headed by Arthur F. White and David Van Alstyne, Jr.

As a result of the changes, the latter group will have six directors on the board of each of the companies. They are: Robert E. Fennell, K.C., John A. McDougald, David Van Alstyne, Jr., A. D. Emil, E. L. Elliott and Hugh Mackay.

Changes made at the special meetings were:

St. Lawrence Corp. — Directors increased from 11 to 15 with four additional directors being Hon. G. B. Foster, K.C., J. E. L. Duquet, Hugh Mackay and E. L. Elliott.

St. Lawrence Paper Mills and Lake St. John Power & Paper — Directors increased from 10 to 16 with six additional members being: J. A. McDougald, David Van Alstyne, Jr., Robert E. Fennell, K.C., A. D. Emil, E. L. Elliott and Hugh Mackay.

Brompton Pulp & Paper—Directors increased from 9 to 17 with the eight additional directors being: A. K. Cameron, J. E. L. Duquet, J. A. McDougald, Robert E. Fennell, K.C., David Van Alstyne, Jr., A. D. Emil, E. L. Elliott and Hugh Mackay.

Following the meeting directors visited the mills of the various companies.

Pratt & Austin Closes June 27

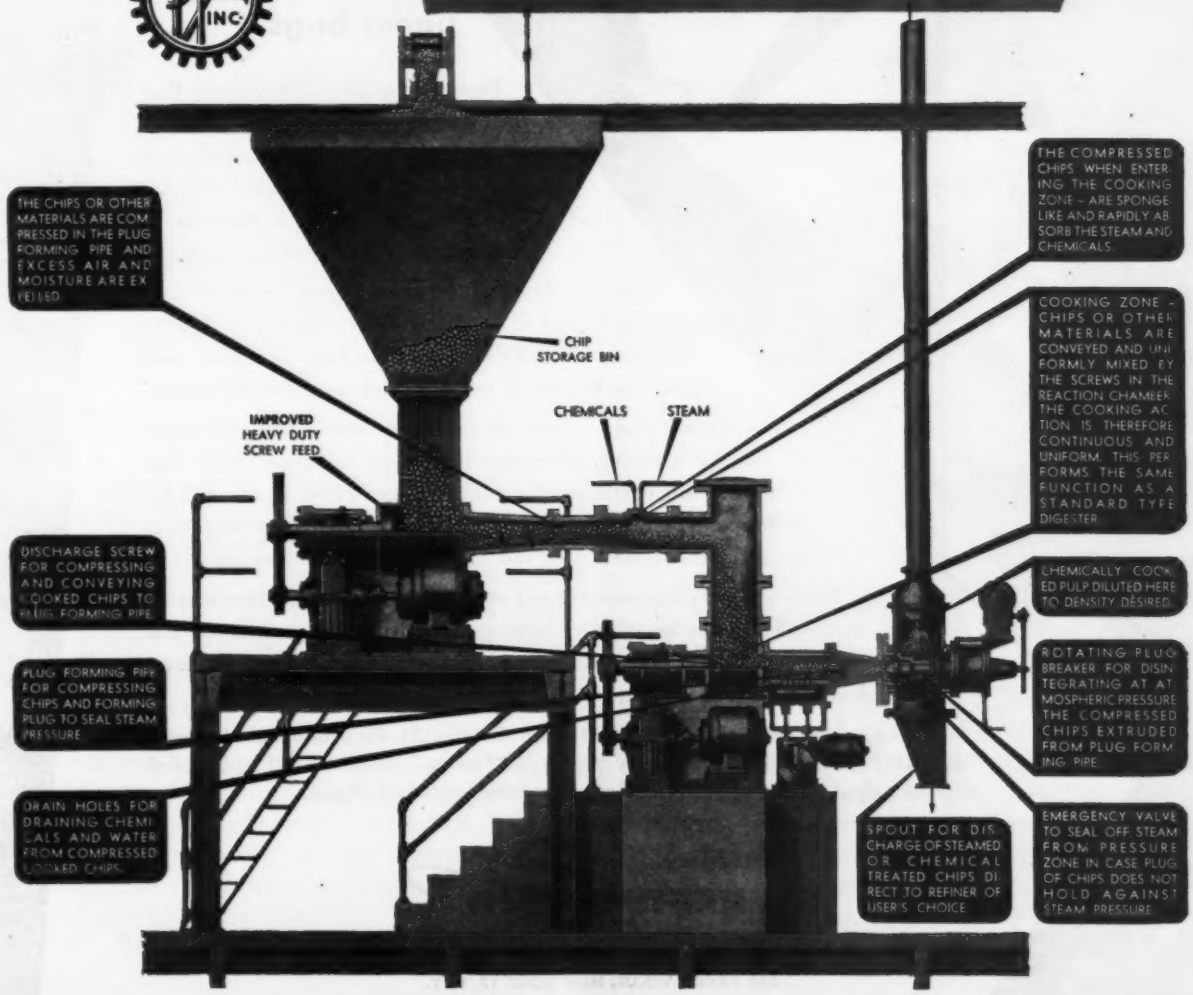
HOLYOKE, Mass.—The Pratt & Austin stationery plant will be shut down completely from June 27 to July 7 for the annual vacation.

PANDIA FIBRILATOR

Patents applied for

For continuous production of Wood, Straw, and Bagasse Pulps suitable for the manufacture of special fibres for industrial uses such as Insulation and Hardboard, Plastics, etc. Built for working pressures up to 300 lbs. Capacities up to 50 tons. Reasonably priced. Now in production. Refiner of customer's choice.

Announcing


THE CHIPS OR OTHER MATERIALS ARE COMPRESSED IN THE PLUG FORMING PIPE AND EXCESS AIR AND MOISTURE ARE EXPELLED
CHIP STORAGE BIN
CHEMICALS
STEAM
IMPROVED HEAVY DUTY SCREW FEED
DISCHARGE SCREW FOR COMPRESSING AND CONVEYING COOKED CHIPS TO PLUG FORMING PIPE
PLUG FORMING PIPE FOR COMPRESSING CHIPS AND FORMING PLUG TO SEAL STEAM PRESSURE
DRAIN HOLES FOR DRAINING CHEMICALS AND WATER FROM COMPRESSED COOKED CHIPS
THE COMPRESSED CHIPS WHEN ENTERING THE COOKING ZONE - ARE SPONGE-LIKE AND RAPIDLY ABSORB THE STEAM AND CHEMICALS.
COOKING ZONE - CHIPS OR OTHER MATERIALS ARE CONVEYED AND UNIFORMLY MIXED BY THE SCREWS IN THE REACTION CHAMBER. THE COOKING ACTION IS THEREFORE CONTINUOUS AND UNIFORM. THIS PERFORMS THE SAME FUNCTION AS A STANDARD TYPE DIGESTER
CHEMICALLY COOKED PULP DILUTED HERE TO DENSITY DESIRED
ROTATING PLUG BREAKER FOR DISINTEGRATING AT ATMOSPHERIC PRESSURE THE COMPRESSED CHIPS EXTRUDED FROM PLUG FORMING PIPE
SPOUT FOR DISCHARGE OF STEAMED OR CHEMICAL TREATED CHIPS DIRECT TO REFINER OF USER'S CHOICE
EMERGENCY VALVE TO SEAL OFF STEAM FROM PRESSURE ZONE IN CASE PLUG OF CHIPS DOES NOT HOLD AGAINST STEAM PRESSURE

PAPER and INDUSTRIAL APPLIANCES, INC.

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PANDIA PRODUCTS:—CHEMIPULPER AND PANDIA FIBRILATOR (FOR CONTINUOUS COOKING WOOD, STRAW, BAGASSE PULP AND OTHER CELLULOSIC MATERIALS). MORLEY CONTINUOUS STRAW COOKING APPARATUS AND PROCESS • ROLL-O-FINER AND SMITH-EGAN BEATER • BRAMMER RECORDING CONSISTENCY CONTROL • PANDIA SCREW FEED FOR REPLACING PLUNGER FEED ON THE ASPLUND DEFIBRATOR.

"Products fashioned from growing trees to serve essential industries"

on the way to new heights of health

• • • •

with the unseen aid of St. Regis multiwall paper bags

Pure, nourishing bread is more than the staff of life . . . it is a ladder to vigorous health and growth. Though taken for granted in this land of plenty, bread is today more pure and nutritious than ever — more valuable as a food for growing youngsters.

Most of the credit for the heightened food value of bread belongs to America's millers and bakers. By their efforts, new, enriched flours have been developed, and higher standards of bread purity have been attained.

Among many sanitary improvements, one of the most significant is the increased use of St. Regis multiwall paper bags as shipping containers for baker's flour. Filled at the mill by high-speed St. Regis packing machines, multiwall bags keep flour clean and pure on the trip by rail and truck from miller to baker.

Producers and processors of many other food products have also adopted Multiwall bags as heavy-duty shipping containers. Today, their use has grown to include over 400 commodities; feedstuffs, cement, lime, fertilizers and chemicals, as well as flour, sugar, salt and other food products.

In its 43 plants throughout North and South America, St. Regis also manufactures: Printing, publication and specialty papers . . . "Tacoma" bleached and unbleached sulphate pulp . . . Panelyte — the St. Regis structural laminated plastic.

ST. REGIS PAPER *Company*

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St. Regis products are sold by St. Regis Sales Corporation:
Offices in New York • Chicago • Baltimore • San Francisco
and 20 other industrial centers
IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal

WALWORTH LUBRICATED PLUG VALVES

offer these advantages

- . . . Direct port opening
- . . . Quarter turn opens or closes valve
- . . . Dead tight shut-off
- . . . Freedom from attack by fluids being handled
- . . . Pressure sealed
- . . . Made in a complete line. Sizes from ½" to 24" for pressures from 175 to 5,000 psi., and for vacuum requirements

THESE are just a few of the reasons why Walworth Lubricated Plug Valves give "top" performance on many *difficult* services.

All Walworth Lubricated Plug Valves employ special insoluble lubricants which protect the plug and body against contact with the line fluid, thus combatting erosion and corrosion.

The lapped surfaces of the valve are "pressure sealed" when the valve is in either the open or closed position. By turning the lubricant screw, lubricant is forced under high pressure through a grooving system that completely encircles the ports as well as the top and bottom of the plug.

The lubricant seals the valve against leakage, and reduces friction between plug and body. This permits easy, quick, full-opening, or tight shut-off with only a quarter turn of the plug.

Number 1700 (illustrated) is a Steel-iron valve, wrench operated, designed for a working pressure of 200 pounds WOG (water, oil, or gas). Valves are available in either screwed or flange types. Screwed type have API line pipe thread lengths. Flanged type (No. 1700F) is faced and drilled to American Standard for 125-pound cast iron flanges unless otherwise specified.

For further information about No. 1700 as well as the complete line of Walworth Lubricated Plug Valves, write for catalog.

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valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

War Department Clears Coosa River Project

(Continued from page 7)

federal reservation known as the Alabama Ordnance Works in Talladega County, where smokeless powder was manufactured during World War II. The location is about forty miles southeast of Birmingham. It is served by the Central of Georgia Railroad. The company also leased from the War Department a number of buildings. These include a 25,000-kilowatt steam power plant and a water filtering and pumping station. The water station can handle up to 23,000,000 gallons of water each day. The company negotiated a five-year lease with the War Department with seven optional five-year renewals, which in effect gives the company a 40-year lease.

Headquarters for the new mill will be located in Birmingham, and the entire operation will be owned and controlled by Southern capital.

President Norton revealed the company already has purchased some 50,000 acres of timberland, which will help supply wood pulp needed for the mill's operation. The mill will ultimately draw on approximately 250,000 acres of timberland for its source of supply.

Another 50,000 acres must be purchased soon, and this problem is causing officers of the newsprint company some concern. Donald Comer, Company Board Chairman, said the company simply cannot afford to pay prohibitive prices for the timberlands to be acquired. He pointed out the lease with the War Department contains a provision that the operators can cancel the entire transaction any time within 18 months after the lease was signed.

"If the prices asked for needed timberlands are too high, we simply will be unable to pay production costs, and the whole project will have to be abandoned," Mr. Comer said.

"This is strictly big league, probably the most modern newsprint mill in the world," Mr. Norton declared. "I believe that this first newsprint in the Southeast will attract at least two or three others, and the world's newsprint industry may well center here within a few years.

"The pines which furnish newsprint regrow in 10 to 15 years in Alabama and Georgia, as contrasted to 60 to 70 years for similar maturity in Canada," he added. "In addition to an ample supply of quick-growing, cheap wood, another is that it can be hauled to the mill the year 'round."

Mr. Norton says he is convinced that the newsprint mill will stimulate other types of paper manufacturing, too, such as towels, disposable tissues and napkins. Gross sales of the Coosa River plant are expected to exceed $15,000,000.

"Ever since the work of Dr. Charles Herty showed the feasibility of manufacturing newsprint from Southern pine, the Southern Newspaper Publishers' Association has had a newsprint mills committee whose function is to achieve the establishment of a large domestic newsprint industry here," he continued.

"Such a mill would make this country less dependent on foreign newsprint sources.

"This committee was influential in obtaining the first mill for newsprint in the South, at Lufkin, Tex. The proposed Alabama mill will be twice as large as Lufkin, when it started.

"Advantages to the government in the lease are many," Mr. Norton said. "Uncle Sam will be relieved of expenses amounting to an estimated $120,000 annually to maintain the defense plant in a standby condition. In addition, the facilities will be maintained and kept available for government use in case of a national emergency.

"Although the mill is to be built primarily to supply Southern newspapers, several large northern newspapers are anxious to buy portions of the output."

Chairman of the board of the Coosa River Newsprint Company is Donald M. Comer, of Birmingham, for many years one of the South's best known textile manufacturers. Clarence B. Hanson, Jr., publisher of the Birmingham News and Age-Herald, is chairman of the newsprint committee of the Southern Newspaper Publishers' Association. This committee is credited with originating the plans for the mill.

Members of the committee include John F. Tims, Jr., New Orleans Times-Picayune and States; James L. Knight, Miami Herald; Ted Dailey, Dallas Morning News; E. K. Gaylord, Oklahoma City Times; Frank Daniels, Raleigh News & Observer; John D. Wise, Richmond Times-Dispatch and News-Leader; and James G. Stahlman, Nashville Banner.

George C. Biggers, of The Atlanta Journal, chairman of the Southern Newspaper Publishers Association board of directors, is an ex-officio member of the newsprint committee.

Temple Joins Moore & White As Sales Engineers

PHILADELPHIA — Richard U. Temple has joined the Moore and White Company, manufacturers of paper making machinery, as sales engineer. Temple formerly held a similar post with the Downingtown Manufacturing Company, of Downingtown.

An engineering graduate of Rutgers University ('26), Temple had a contracting business in New Jersey until 1932, when he became superintendent of the Ruberoid Company's paper mill at Gloucester City, N. J.

In 1940 he went to the Downingtown firm, traveled all over the country, particularly the South, for that company. He remained with Downingtown until Moore & White obtained his services

Hooker Chemical to Split Up Its Stock

NIAGARA FALLS, N. Y. — A special meeting of stockholders of Hooker Electrochemical Company has been called for June 26, for the purpose of approving a two-for-one splitup in the outstanding common stock, and authorization of a new issue of 200,000 shares of cumulative preferred stock.

In its annual report issued in January the company stated that commitment already had been made for over $5,000,000 for a substantial program of capital expenditure. The new program is in addition to such earlier commitments and involves, according to the letter, further increases in the basic output of chlorine and caustic soda at the Niagara Falls and Tacoma plants and a still broader diversification as a result of the company's development and research activities. Buildings have been constructed and equipment installed for the production of DDT, hexachlorocyclohexane, monochloracetic acid, and other products. A portion of the funds for capital expenditures already authorized has been secured from current and accumulated earnings and from a term bank loan, according to the letter.

Sales and earnings of the company for the first five months of the current fiscal year have been substantially higher than for the same period in the preceding year.

Australia Increases Its Printing Paper Imports

Perth, West Australia

Total imports of newsprint during the month of January, 1947, were 14,053 tons, valued at $1,681,733, as compared with the 14,920 tons of the previous month and the 12,840 tons of January, 1946.

A marked increase in the imports of other printing papers was shown, eight countries shipping paper as follows: United Kingdom, 612 tons (259 tons in December); Norway, 250 tons (84 tons); Canada, 185 tons (532 tons); Finland, 146 tons (25 tons); Sweden, 87 tons (47 tons); United States, 65 tons — valued at $22,877 (nil); Italy; 18 tons (nil); and Belgium, 3 tons (nil).

Australian Paper Manufacturers, Ltd., announce that their capital is to be increased from 4,600,000 pounds to 10,000,000 pounds ($48,000,000 at par). In a recent speech the chairman (Sir Norman Brookes) said that price control was detrimental to Australia's future. "It tends definitely to a reduction of efficiency," he said, "for it removes incentive. From our own experience we can say quite specifically that one of the most difficult things that we have had to do under price control is to prevent the growth of the attitude of mind that costs do not matter because prices and/or profits are fixed"

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MEAD
pulp

DISTRIBUTORS OF WOOD PULP
BLEACHED AND UNBLEACHED
CHEMICAL AND MECHANICAL WOOD PULP

When the Frenchies on the Night Shift had cut one side of a tree, Paul Bunyan would twist the tree with his fingers to provide moonlight for cutting the other side.

A reproduction of this incident from the fabulous life of Paul Bunyan—the nineteenth of a series—will be sent on request. It will contain no advertising.

IMPORTS

NEW YORK IMPORTS

WEEK ENDING JUNE 14, 1947

SUMMARY

Newsprint	15,085 rolls
Coated Paper	44 cs.
Paperhangings	24 pkgs.
Wrapping Paper	1058 rolls
Filter Paper	35 cs.
Drawing Paper	2 cs.
Gummed Paper	8 drums, 68 cs.
Photo Paper	177 cs.
Wafer Paper	10 cs.
Tissue Paper	4 cs.
Litho Paper	10 cs.
Strawboard	2207 pkgs., 400 rolls
Sulphite Paper	573 rolls
Miscellaneous Paper	319 rolls

NEWSPRINT

(———), Moordam, Rotterdam, 210 rolls.
News Syndicate Co., Inc., Colabee, Baie Comeau, 7387 rolls.
International Paper Sales Co., C. A. Draper, Dalhousie, 6056 rolls.
Robert A. Olsen, A.C.D., Donnacona, 379 rolls.
Robert A. Olsen, G.D.D., Donnacona, 372 rolls.
International Paper Co., International No. 1, Gatimeau, 304 rolls.
Robert A. Olsen, Kermic, Donnacona, 377 rolls.

COATED PAPER

F. P. Gaskell, Parkersburg Victory, Glasgow, 44 cs. (for cigarette tips).

PAPERHANGINGS

W. H. S. Lloyd & Co., American Scout, London, 24 pkgs.

WRAPPING PAPER

Clinton Paper Corp., Fort Amherst, St. Johns, 602 rolls (sulphite).
Resolute Paper Products Corp., Hunter Victory, Gothenburg, 456 rolls (sulphite).

FILTER PAPER

H. Reeve Angel & Co., Inc., American Scout, London, 34 cs.
Canadian National Railways, Hunter Victory, Gothenburg, 1 cs.

DRAWING PAPER

H. Reeve Angel & Co., Inc., American Scout, London, 2 cs.

GUMMED PAPER

B. F. Drakenfeld & Co., James Bennett Moore, Liverpool, 32 cs., 8 drums.
B. F. Drakenfeld & Co., Paul Bunyan, Liverpool, 36 cs.

PHOTO PAPER

J. J. Gavin & Co., American Scout, London, 4 cs.
American Express Co., American Scout, London, 123 cs. (base).
Lep Transport, Inc., American Scout, London, 50 cs. (base).

WAFER PAPER

Pfeil & Holing, Noordam, Rotterdam, 10 cs.

TISSUE PEPER

Meadows Wye & Co., James Bennett Moore, Liverpool, 4 cs.

LITHO PAPER

Sun Chemical Corp., Marine Flyer, Shanghai, 10 cs.

STRAWBOARD

H. A. Gogarty, Noordam, Rotterdam, 7 pkgs.
Wedeman & Godknecht, Noordam, Rotterdam, 2200 pkgs., 400 rolls.

SULPHITE PAPER

Resolute Paper Products Corp., Hunter Victory, Gothenburg, 122 rolls.
Manufacturers Trust Co., Hunter Victory, Gothenburg, 406 rolls.
Blauvelt Wiley Paper Manufacturing Co., Hunter Victory, Gothenburg, 45 rolls.

MISCELLANEOUS PAPER

F. C. Strype, Hunter Victory, Gothenburg, 319 rolls.

RAGS, BAGGINGS, ETC.

(———), James Bennett Moore, Manchester, 82 bls. cotton rags.
(———), James Bennett Moore, Liverpool, 23 bls. cotton webbing; 65 bls. cotton strips.
(———), Gerda, Dan, Callao, 13 bls. worsted sweater clips.
O'Brien Products, Leise Maersk, Shanghai, 300 bls. cotton waste.
Tradesmans National Bank Trust Co., American Scout, London, 71 bls. old webbing.
Tradesmans National Bank Trust Co., Parkersburg Victory, Glasgow, 1038 bls. old webbing.
E. J. Keller Co., Inc., Parkersburg Victory, Glasgow, 30 bls. paperstock.
Castle & Overton, Inc., Paul Bunyan, Liverpool, 73 bls. grey linen thread waste.
Manufacturers Trust Co., Albion Victory, Genoa, 61 bls. bagging.
Atlas Waste Manfg Co., Phoebe Knot, Havana, 14 bls. cotton waste.
O'Brien Products, Inc., Marine Flyer, Shanghai, 200 bls. cotton waste.
New England Waste Co., Marine Flyer, Shanghai, 600 bls. cotton waste.
Camden Fiber Mills, Marine Flyer, Shanghai, 250 bls. cotton waste.
(———), Marine Flyer, Shanghai, 100 bls. jute rags.
Darmstadt Scott & Courtney, Marine Flyer, Shanghai, 180 bls. jute rags.
Castle & Overton, Inc., Marine Flyer, Shanghai, 100 bls. jute rags.
E. J. Keller Co., Inc., Marine Flyer, Shanghai, 115 bls. jute rags.

OLD ROPE

1st National Bank of Boston, Paraguay, Copenhagen, 306 coils.
(———), Pampero, Calcutta, 681 bls. (hemp rope cuttings).

GLUESTOCK, ETC.

Herman Hollander, Iberville, Manila, 54 bls. dry hide cuttings.
Irving Trust Co., James Bennett Moore, Manchester, 151 bags dry hidecuttings.
Milligan & Higgins Corp., Gerda Dan, Havana, 169 bags dry fleshings.
John Gorvers Co., Gerda Dan, Havana, 74 bls. gluestock.
John Gorvers Co., Cape Isabel, Barranquilla, 610 rolls hide cuttings.
Darmstadt Scott & Courtney, Mesh Knot, Vera Cruz, 172 bls. gluestock.

CHINA CLAY

Orbis Products Corp., Gloucester City, Bristol, 252 bags; 9 tons 7 cwt.

WOODPULP

Perkins Goodwin & Co., Colabee, Baie Comeau, 1056 bls. woodpulp.

BOSTON IMPORTS

WEEK ENDING JUNE 14, 1947

Bank of N. Y. Trust Co., Exceller, Leghorn, 68 bls. linsey garments.
Gottesman & Co., Inc., Tullahoma, Gothenburg, 1000 bls. bleached sulphite pulp; 2615 bls. sulphate pulp.
Bulkley Dunton Pulp Co., Tullahoma, Gothenburg, 2450 bls. sulphate pulp.
(———), Tullahoma, Gothenburg, 2753 rolls kraft paper.
Pulp & Paper Trading Co., Tullahoma, Gothenburg, 600 bls. sulphite pulp.
Cellulose Sales Co., Tullahoma, Gothenburg, 3000 bls. sulphate pulp.
Manufacturers Trust Co., Exporter, Genoa, 179 bls. bagging.
E. J. Keller Co., Inc., Exporter, Haifa, 120 bls. cotton rags.
(———), American Scout, London, 50 cs. waxed wrapping paper.
S. H. Waldstein, Marine Flyer, Bombay, 80 bls. cotton waste.

PHILADELPHIA IMPORTS

WEEK ENDING JUNE 14, 1947

Parsons & Whittemore, Inc., Hunter Victory, Gothenburg, 1130 bls. dry sulphite pulp.
Castle & Overton, Inc., Hunter Victory, Gothenburg, 3048 bls. dry sulphite pulp.
E. W. Twitchell, Inc., Hunter Victory, Gothenburg, 250 rolls kraft paper, 213 rolls sulphite paper.

BALTIMORE IMPORTS

WEEK ENDING JUNE 14, 1947

Swedish American Pulp Corp., Hunter Victory, Gothenburg, 3503 bls. dry woodpulp.
Gottesman & Co., Inc., Hunter Victory, Gothenburg, 5080 bls. dry sulphate pulp.
Elof Hansson, Inc., Hunter Victory, Gothenburg, 5 rolls refined cellulose; 966 bls. dry viscose rayon pulp.

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. . . we knew we had something unusual for the paper industry.

And we have. It is called Compound G-4*—our fungicidal agent. And though 500% was the best result obtained, felt life was substantially prolonged in every test, in no case less than 45%.

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You will find G-4 doubly economical . . . in your initial cost, because a little goes a long way . . . and in your later costs, because it extends felt life, helps to sustain production, prevents shutdowns.

In every application, G-4 leaves the felts soft, open and bacteria-free . . . resists leaching . . . remains present in effective fungicidal proportions when felts are removed.

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TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, June 18, 1947.

Demand for paper and paperboard is still in excess of supply. While there is some easing in the demand for fancy paper and some specialty items, the pressure on kraft papers and sanitary tissues continues heavy. Allocations are declining except for large lot orders; it is still almost impossible to satisfy the demand for large lots. . . . The tight raw material supply situation shows signs of easing in certain localities. In parts of the South and Middle West converters are expanding capacity because of better supplies of raw materials. . . . Manufacturers of fine book and groundwood printing papers continue to place emphasis on the production of higher grades of paper. Increased buyer resistance to this upgrading is reported. Raw material supplies continues to be the chief problem of the mills in this group. The supply of chemicals has improved in some sections, notably the South, where production of bleached papers has picked up. Inadequate supplies of chemicals are interfering with full production in the Midwest, while operations of the nonintegrated mills in the East are hampered for lack of wood pulp. . . . The coarse paper supply situation shows signs of easing in some sections of the country. Reports from the Midwest indicate the coarse paper supply from Wisconsin mills is somewhat improved with some jobbers getting considerable kraft from Southern mills although none is available locally. Converters in this area, as in sections of the South, are reported to be expanding production because of the better supply of raw materials.

The index of general business activity for the week ended June 7 declined to 145.1 from 145.8 in the previous week, compared with 125.9 for the corresponding week in 1946. The index of paperboard production dropped to 179.7 from 209.9 in the previous week, compared with 167.9 for the corresponding week in 1946.

Paper production for the week ended June 7 was estimated at 104.4 percent, compared with 105.6 for the preceding week, with 104.0 for the corresponding week in 1946, with 92.8 for 1945, with 90.7 for 1944, and with 88.0 percent for the corresponding week in 1943.

Paperboard production for the week ended June 7 was 98.0 percent of capacity, compared with 98.0 percent for the preceding week, with 96.0 percent for the corresponding week in 1946, with 97.0 for 1945, with 96.0 for 1944, and with 92.0 for the corresponding week in 1943.

Some easing in demand for paperboard shipping containers has been noted recently, but in the main indications are that supplies will be tight in the third quarter and only slightly easier in the fourth quarter of 1947. A somewhat better supply is expected in the first quarter of 1948, if new machines, now being installed, are in production by January. Some in the industry feel that the considerable increase in capacity will be substantially offset by the elimination of obsolete equipment. . . . A $500,000 plant will be erected at Beacon, N. Y., for the production of Durisol. This is a low cost insulation and wall material developed in Switzerland, where it is now in wide use. This plant is the first of six which Durisol, Inc., an American company, plans to build in the United States. The company also intends to erect two factories in Canada and another in Mexico. . . . Durisol is a lightweight slab which combines the qualities of both wood and stone and it can be saw-cut and nailed. Its basic ingredient consists of wood fibers. These are chemically treated to render them fire-resistant and termite-proof. They are then mixed with cement and other materials. . . . Two types of Durisol slabs will be produced. One, two inches thick, is for insulation purposes. The other, five inches thick, is intended for use as the complete exterior walls of homes. This wall slab will have stucco on the outside and plaster on its interior surface. The in-place cost of the exterior wall slabs to the home builder will be about 70 cents per square foot. This compares with the present cost of wood walls in houses of about 90 cents per square foot.

A record peak of $43.36 was reached in average weekly earnings of production workers in the paper and allied products industries during February 1947. Although the increase was only 0.9 percent over the preceding month's earnings, it was 14.5 percent above those in February 1946. Increases in February 1947 weekly earnings over those of a year ago for the individual segments were as follows: envelope, 17.2 percent; paper boxes, 15.2 percent; paper bags, 13.6 percent; and paper and pulp, 13.4 percent. . . . The general trend toward fewer working hours continued during February. In comparison with the same month last year, February 1947 weekly hours decreased 2.5 percent in the paper bag industry; 2.4 percent in paper and pulp; 1.7 percent in paper boxes; 0.9 percent in envelopes; and 1.7 percent in paper and allied products as a whole. . . . With the exception of the paper bag field, February 1947 hourly earnings in the individual segments of the paper and allied products industries reached record peaks. While the increases over hourly earnings in the preceding month were small, they were greater than the earnings in February 1946. . . . Substantial decreases were registered in the rates of separations and accessions in the paper and allied products industries during February 1947 compared with those of a year ago. The rates of decline in separations and accessions of men were greater than for women.

Pulpwood

National receipts of pulpwood at pulp and paper mills continue to maintain levels closely approaching the record highs achieved by the industry during recent years. With the single exception of the New England region, pulpwood is coming in to the mills in quantities adequate for capacity or near capacity operations. Consumption of 1,701,000 cords of pulpwood in March was an all-time record with both the Lake states and the South establishing new high marks in that month. Consumption in the Appalachian district was only a little below the peak month of January 1947. Over-all inventories of 4,275,000 cords also set a new record in the field of national woodpulp stocks with the South and Lake states establishing new highs for their respective regions. In the South some mills are deliberately retarding pulpwood movement to prevent accumulating a surplus of wood that will tend to deteriorate with the approaching warm weather.

Wood Pulp

An improvement in the market pulp situation would seem to depend on several factors. There are indications of a possible increase of nearly 2 million tons in wood pulp production capacity by the end of 1948, of which about 800,000 tons are expected to materialize in 1947, only very little of this tonnage is expected to be available to the non-integrated mills. Imports of Canadian pulp, which form upwards of 25 percent of our market pulp supplies, have shown an over-all increase of about 16 percent during the first quarter of 1947 over the same period last year. This increase, however, must be attributed to larger shipments to integrated United States mills inasmuch as imports of purchased pulp from Canada have remained at about the same level for the last 10 months.

Waste Paper

Over-all demand for waste paper by paper mills was reported easing as most mills prepared for their annual shutdowns which customarily are made in June or July. Demand is expected to be dull until the middle of July, when most mills will have resumed operations.

Demand for news was described as not strong, although there appeared to be no distress merchandise on the market. Demand for mixed paper was said to be weak due to heavy supplies. Accelerated consumption has improved the demand for corrugated.

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PRICES

With the elimination of price controls on paper, pulp, rags and other materials, the quotations given below once more become indicative of trends in an open market. At the moment they can be of little more, for, while some volume business still is being done under contract at the figures given below, fluctuations representing special conditions are too varied and too frequent to permit prices to be given as representing a wholly stabilized market.

Paper

(Delivered New York)

Standard News, per ton—
Roll, contract ....$84.00 to $90.00
Sheets .....103.00 " 109.00

Kraft—per cwt.—Carload Quantities
Zone A, Delivered
40 lb. base weight

Superstandard Wrapping	$7.00	to	—
No. 1 Wrapping...	6.50	"	6.75
Standard Wrapping	6.00	"	6.25
Standard Bag	5.75	"	6.25

Tissues—Per Ream 24x36 (480) 10 lb. Zone 1.

Wh. No. 1 Frd.....	1.35	to	1.65
Wh. No. 1 M. G....	1.35	"	1.65
Wh. No. 1½.....	1.20	"	1.45
Wh. No. 2	1.30	"	1.55
Wh. Anti-Tar	2.75	"	4.25
Kraft Unbl.	1.45	"	1.85
Manila No. 2	1.25	"	1.45

Toilet—Per Case of 100 rolls—1 M Sheets.

Unbleached	4.47	to	5.50
Bleached	6.50	"	—

Paper Towels—Per Case of 3750—Zone 1.

Wh. C. fold 11x13¼	4.39	to	4.80
Br. Sgl. fold 10 in.	2.67	"	3.00
Br. M'tif'd 9½x14¼	3.78	"	4.15
Br. M'tif'd 9½x9¼.	2.67	"	3.00

Manila—per cwt.—C. l. f. n.

No. 1 Jute.....	11.25	to	—
No. 1 Manila 35 lb.	6.00	"	7.00

Boards, per ton—

News $92.50		"	—
Chip 90.00		"	—
Sgl. Mla. L1 Chip*	102.50	"	—
White Pat. Coated*	120.00	"	—
Kraft Liners 42 lb.*	84.00	"	95.00
Binders Boards .. 94.00		"	126.00

* Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following prices are representative of distributors' resale prices, all deliveries in Zone 1: Rag Content Bonds and Ledgers—

White, Assorted Items
Bonds, per cwt.

	Carton	4 C't'n	Ton
100% Rag Ext. No. 1	$55.00	$50.00	$48.00
100% Rag	46.50	43.00	41.25
75% Rag	35.00	32.50	31.50
50% Rag	31.50	28.75	27.50
25% Rag	28.00	25.50	24.50

Ledgers, per cwt.

100% Rag Ext. No. 1	$54.25	$50.00	$48.00
100% Rag	46.25	42.50	40.75
75% Rag	36.00	33.25	31.75
50% Rag	31.00	28.00	27.00
25% Rag	27.25	24.75	23.75

Sulphite Bonds and Ledgers—
White, Assorted Items
Bonds, per cwt.

No. 1	$18.75	$16.25	$15.50
No. 2	17.00	15.25	14.50
No. 4	16.00	14.50	14.00

Ledgers, per cwt.

No. 1	$17.00	$17.00	$16.35
No. 2	17.75	16.25	15.50
No. 4	17.00	15.00	14.25

Free Sheet Book Papers—
White, Cased Paper

(Per cwt.)	Case	Ton
No. 1 Glossy Coated...	$19.40	$18.60
No. 2 Glossy Coated...	18.15	17.35
No. 3 Glossy Coated...	17.65	17.00

(Per cwt.)	Case	Ton
No. 1 Antique (Water marked)	$14.90	$14.25
No. 2 Offset	15.35	14.70
A Grade E. F.	13.90	13.30
A Grade S. & S. C.....	14.40	13.70
B Grade E. F.	Nominal	
B Grade S. C	Nominal	
C Grade E. F.	Nominal	
C Grade S. C	Nominal	
D Grade E. F.	Nominal	
D Grade S. & S. C.....	Nominal	

Wood Pulp

Domestic mill prices delivered with former OPA freight allowances.

	Per Short	ADT
Groundwood	$75.00 to	$80.00
Unbleached Sulphite.	115.00 "	117.00
Bleached Sulphite ..	121.00 "	125.00
Bleached Soda	115.00 "	120.00
Unbleached Kraft	112.50 "	120.00
Southern Kraft	90.00 "	102.50

Canadian mill Prices delivered with freight allowances unless otherwise specified:

	Per Short	ADT
Select Unbleached Kraft (no freight allowance)	115.00 "	—
Unbleached Sulphite.	115.00 "	117.00
Glassine Unbleached Sulphite (no freight allowance)	112.00 "	—
Bleached Soda	105.00 "	115.00
Groundwood	75.00 "	80.00
Sideruns Pulping News	75.00 "	80.00
Hardwood and Specialty Grades	Nominal	

Swedish Quotations
Ex. dock, New York

	Per Short	ADT
Bleached Kraft .....$	150.00 to	156.00
Bleached Sulphite ...	151.00 "	158.50
Unbleached Sulphite..	121.00 "	131.00
Unbleached Kraft	116.00 "	126.00

Finnish Quotations
Ex. dock, New York

	Per Short	ADT
Bleached Sulphite	$165.00	
Unbleached Sulphite	132.50	
Unbleached Sulphite (special grade)	137.50	
Unbleached Sulphate	132.50	
Unbleached Sulphate (special grade)	159.00	

New Domestic Cotton Cuttings

(Prices delivered Mill Plus Dealer's Commission)

White Shirt .....$	11.50	to	$12.00
Light Silesias	7.50		
Unbleached Muslin ...	11.50	"	12.00
White Back Blue Overalls	8.25		
Blue Overalls	7.75		
Unbl. Fancy Shirt....	4.50	"	5.00
Light Percales	5.50	"	6.00
Light Prints	5.25	"	5.95
Washables	4.00		
Bleachable Khaki	5.50	"	6.00
Unbleachable Khaki ..	5.00	"	5.50
Cottonades	4.50	"	5.00

Old Domestic Cotton Rags

(F.O.B. Shipping Point Plus Dealer's Commission)

	Per 100 lbs.
No. 1 Whites Repacked.....	$5.00
No. 1 Whites Miscellaneous..	4.25
No. 2 Whites Repacked.....	4.00
No. 2 Whites Miscellaneous..	3.50
Blue Overalls	3.75
Thirds and Blues Repacked..	3.00
Thirds and Blues Miscellaneous	2.50
No. 1 Roofing Rags.....	2.20
No. 2 Roofing Rags.....	2.10
No. 3 Jute Bagging.....	2.00
No. 4 Brussels and hard back carpets	2.00
No. 5A Roofing Rags.....	2.00

New Foreign Cotton Cuttings

(Prices delivered Mill)

	Per 100 lbs.	
New Dark Cuttings....	$6.00 to	—
New Mixed Cuttings...	6.50 "	—
Light Silesias	9.00 "	10.00
Light Flannelettes	8.00 "	9.00
New White Cuttings ...	13.00 "	15.00
Fancy Shirt Cuttings...	9.00 "	10.00
Light Prints	8.00 "	10.00
Bleachable Khaki, No. 1	7.00 "	7.50
Unbl. Khaki, No. 1....	6.25 "	6.75

Old Foreign Rags

(F.O.B. New York)

	Per 100 lbs.	
No. 1 White Linens...	$14.00 to	16.00
No. 2 White Linens...	12.00 "	13.00
No. 3 White Linens...	8.00 "	9.00
No. 4 White Linens...	8.00 "	9.00
No. 1 White Cottons...	10.00 "	12.00
No. 2 White Cottons...	8.00 "	9.00
No. 3 White Cottons...	6.50 "	7.00
No. 4 White Cottons...	5.00 "	5.50
Extra Light Prints...	7.50 "	8.00
No. 1 New Light Prints	6.25 "	6.75
Med. Light Prints.....	5.25 "	5.75
Dutch Blue Cottons....	5.25 "	5.50
Checks and Blues.....	4.00 "	4.25
Linsey Garments	3.00 "	3.75
Dark Cottons	2.50 "	3.00
Old Shopperies	2.50 "	3.00
New Shopperies	2.50 "	3.00

Bagging

(Prices to Mill, f.o.b. N. Y.)

	Per 100 lbs.	
Foreign Gunny, No. 1..	$4.75 to	5.00
Domestic Gunny, No. 1	4.25 "	4.50
Light Wool Tares.....	4.50 "	4.75
Heavy Wool Tares.....	4.75 "	5.00
Bright Bagging	4.25 "	4.50
Foreign Manila Rope...	6.00 "	7.00
Domestic Manila Rope	5.75 "	6.50
Jute Strings	4.50 "	5.00
No. 1 Sisal Strings ..	5.50 "	6.00
Mixed Strings	1.75 "	2.50

Waste Paper

Prices to Mills
(Dollars Per Ton)
F.o.b. New York, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	@	$120.00
No. 1 Hard White Envelope Cuts	90.00	"	100.00
No. 1 Hard White Shavings, unruled..	100.00	"	110.00
No. 1 Hard White Shavings, ruled	80.00	"	90.00
Soft White Shavings, one cut	95.00	"	105.00
No. 1 Soft White Shavings	85.00	"	95.00
Soft White Shavings, Misc.	65.00	"	75.00
No. 1 Fly Leaf Shavings	55.00	"	60.00
No. 2 Fly Leaf Shavings	50.00	"	55.00
No. 1 Groundwood Fly Leaf Shavings	30.00	"	33.00
No. 2 Mixed Groundwood Fly Leaf Shavings	(nominal)		
Mixed Colored Shavings	(nominal)		
Mixed Groundwood Colored Shavings...	(nominal)		
Overissue Magazines..	(nominal)		
No. 1 Heavy Books & Magazines	30.00	"	37.50
Mixed Books	15.00	"	20.00
No. 1 White Ledger..	60.00	"	65.00
New Manila Envelope Cuttings, one cut..	100.00	"	110.00
New Manila Envelope Cuttings	65.00	"	75.00
Extra Manilas	35.00	"	40.00
Mixed Kraft, Env. & Bag Cuttings	75.00	"	85.00
Kraft Envelope Cuttings	100.00	"	105.00
Triple Sorted, No. 1 Brown Soft Kraft.	60.00	"	70.00
New 100% Kraft Corrugated Cuttings ..	60.00	"	70.00
No. 1 Assorted Old Kraft	40.00	"	50.00
New Jute Corrugated Cuttings	27.00	"	—
Old 100% Kraft Corrugated Containers.	(nominal)		
No. 1 News	19.00	"	20.00
No. 1 Mixed Paper..	17.00	"	19.00
Box Board Cuttings..	20.00	"	—
White Blank News...	75.00	"	80.00
Overissue News	(nominal)		
Old Corrugated	28.00	"	30.00
Mill Wrappers	22.00	"	25.00

Twines

All Prices Nominal
(F. o. b. Mill)
(Soft Fiber)

Coarse Polished—India	.26	@	.29
Fine Polished—Fine India	.31	"	.35
Unpolished—Paper Makers	.20	"	.26
Tube Rope	.22	"	.27½
Wrapping	.26	"	.33½
Cotton	.70	"	—
(Hard Fiber)			
Mex. Sisal	.21	"	.24
Manila	.33	"	—
(Hemp)			
Polished Hemp	.63	"	—

PHILADELPHIA

Domestic Rags (New)

(F.O.B. Eastern Shipping Point)

Shirt Cuttings— New White No. 1..	.10½	@	.11
New White No. 2..	nominal		
Light Silesias	.07½	"	.08
Black Silesias, soft	.06½	"	.07
New Unbleached ..	.10½	"	.11¼
Washable Prints ..	.06½	"	.07
Washable No. 1....	.05	"	.05½
Blue Overall	.07½	"	.08
Cottons—According to grades— Washable Shredding	.03½	"	.04
Fancy Percales	.06¾	"	.07¼
New Black Soft....	nominal		
Khaki Cuttings— Unbleachable Cotton Cuttings	.05½	"	.06
Bleachable Cotton Cuttings	.06½	"	.07
Men's Corduroy ..	.05½	"	.06
Ladies' Corduroy ..	.05	"	.05½
Cottonades	.05½	"	.06

Domestic Rags (Old)

(F.O.B. Eastern Shipping Point)

White No. 1—Repacked	4.50	@	5.00
Mixed White	4.00	"	4.25
White No. 2—Repacked	3.50	"	3.75
Thirds and Blues— Miscellaneous	2.25	"	2.50
Repacked	2.75	"	3.00
Roofing Stock— Foreign No. 1.....	nominal		
Domestic No. 1....	2.00	"	2.05
Domestic No. 2....	1.90	"	1.95
Roofing Bagging ..	1.90	"	1.95
Old Manila Rope....	5.75	"	6.00

Bagging

(F.O.B. Eastern Shipping Point)

Gunny No. 1— Foreign	nominal		
Domestic	4.25	@	4.50
No. 1 Clean Bright— Sisal Strings	.04	"	.04½
No. 2 Clean Bright— Sisal Strings	.03	"	.03½
Sisal Jute	.02¾	"	.03
Scrap— No. 1	3.25	"	3.50
No. 2	1.75	"	1.85

Liquid Chlorine

BECAUSE liquid chlorine is such an important agent in paper production, many leading paper manufacturers all over the country look to Pennsalt as their source of this vital bleaching chemical.

Pennsalt was a pioneer in liquid chlorine production in this country, and for nearly half a century has supplied a high quality chlorine to Industry.

PENNSALT PRODUCTS for the Pulp and Paper Industry: Liquid Chlorine • Bleaching Powder • Corrosion-Proof Cements • Anhydrous Ammonia • Acids • Perchloron* • Sodium Chlorate • Potassium Chlorate • Sodium Arsenite • Sodium Hypochlorite • Hydrogen.

*Reg. U. S. Pat. Off.

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Wool Tares, heavy...	4.00	"	4.25
New Burlap Cuttings	6.00	"	6.50

Old Papers

(F. o. b. Phila.)
Mill Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	$100.00	@	$115.00
No. 1 Hard White Shavings, unruled..	108.00	"	—
Soft White Shavings, one cut	90.80	"	95.00
White Blank News..	60.00	"	65.00
Soft White Shavings.	80.00	"	—
No. 1 White Ledger.	75.00	"	80.00
Ledger, colored	60.00	"	65.00
No. 1 Heavy Books & Magazines	40.00	"	45.00
Overissue Magazines..	nominal		
New Manila Envelope Cuttings	80.00	"	—
No. 1 Assorted Old Kraft	60.00	"	65.00
No. 1 Mixed Paper..	20.00	"	—
Box Board Cuttings..	20.00	"	—
Kraft Corrugated Cuttings	nominal		
Old Corrugated	30.00	"	35.00
Overissue News	40.00	"	—
No. 1 News	—	"	30.00

BOSTON

Old Papers

(F. o. b. Boston)
Mill Prices, Baled

No. 1 Hard White Shavings, unruled..	7.00	@	8.00
No. 1 Hard White Shavings, ruled	7.00	"	8.00
Soft White Shavings, Misc.	6.25	"	6.50
No. 1 Fly Leaf Shavings	1.65	"	1.80
No. 2 Fly Leaf Shavings	2.00	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	1.25	"	1.50
Mixed Colored Shavings	2.50	"	2.75
New Manila Envelope Cuts, one cut	5.00	"	5.50
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft.	3.50	"	3.75
Mixed Kraft Env. & Bag Cuttings	3.75	"	4.00
Kraft Envelope Cuttings	3.75	"	4.00
No. 1 Heavy Books & Magazines	2.50	"	2.60
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	4.25	"	4.50
Groundwood Tabulating Cards	1.35	"	—
White Blank News..	1.65	"	—
No. 1 Assorted Old Kraft	3.50	"	—
No. 1 Mixed Paper..	—	"	.95
Overissue News	1.50	"	1.75
Box Board Cuttings..	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers.	1.75	"	—
Old Corrugated Containers	1.50	"	—
Jute Corrugated Cuttings	1.07½	"	—
Paper Strings	2.25	"	2.50

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	—	@	4.75
Domestic	—	"	4.75
Sisal Rope No. 1	6.00	"	—
Sisal Rope No. 2	5.50	"	—
Mixed Rope	5.25	"	—
Mixed Strings	2.00	"	2.50
Transmission Rope—			
Foreign	(nominal)		
Domestic	3.00	"	3.50
Manila Rope—			
Foreign	(nominal)		
Domestic	6.25	"	—
Soft Jute Rope	5.00	"	5.25
Jute Carpet Threads.	6.00	"	—
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	—	"	4.75
Domestic	—	"	4.87½
South America	5.25	"	—
Wool Tares—			
Foreign	4.50	"	—
Domestic	4.50	"	—
Aust. Wool Pouches..	5.00	"	5.25
New Zealand Wool Pouches	5.25	"	5.50
New Burlap Cuttings	6.00	"	6.50
Heavy Baling Bagging	5.25	"	5.75
Paper Mill Bagging..	3.50	"	3.75
No. 1 Roofing Bagging	1.75	"	—

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints.	.07	@	.07½
Fancy Percales	.07½	"	.08
New White No. 1..	.10	"	.11
New Light Flannelettes	.08	"	.08½
Canton Flannels, Bleached	.10	"	.11
Underwear Cutters, Bleached	.10	"	.11
Underwear Cutters, Unbleached	.11	"	.12
Silesias No. 1	.07	"	.08
New Black Silesias..	.05	"	—
Red Cotton Cuttings.	.05	"	—
Soft Unbleached	.11	"	.12
Blue Cheviots	.07¼	"	.08
Fancy	.06	"	—
Washable	.06	"	—
Khaki Cuttings	.06	"	.07
O. D. Khaki	.07	"	—
Corduroy	.03½	"	—
New Canvas	.06¾	"	.06¾
B. V. D. Cuttings	.10	"	.11

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues,			
Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	2.00	"	—
No. 2	1.90	"	2.00
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A..	1.35	"	—
Quality B..	1.20	"	—
Quality C..	.95	"	—
Old Manila Rope	6.00	"	—

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)
Mill Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	$110.00	@	$120.00
No. 1 Hard White Shavings, unruled..	105.00	"	115.00
No. 1 Soft White Shavings	80.00	"	95.00
No. 1 White Ledger..	55.00	"	65.00
No. 1 Heavy Books & Magazines	40.00	"	43.00
White Blank News..	43.00	"	49.00
Mixed Kraft Env. & Bag Cuttings	75.00	"	85.00
No. 1 Assorted Old Kraft	45.00	"	55.00
Overissue News	28.00	"	—
No. 1 News	25.00	"	—
No. 1 Mixed Paper..	20.00	"	—
Old Corrugated	36.00	"	—
Mill Wrappers	22.00	"	—

MARKETS

BLANC FIXE—Deliveries improving with supplies adequate to meet steady demand. Pulp is currently quoted at $55 per ton, in barrels, car lots, at works; and $60 less car lots same basis.

BLEACHING POWDER — Paper mill demand eased considerably, supply tight. Shipments sometimes delayed. Quotations are unchanged. Prices on bleaching powder range from $2.75 to $3.75 per 100 pounds.

CASEIN—Current prices on processed acid precipitated casein are reported around 24 to 26 cents per pound for domestic grades and 28 to 32 cents for imported grades f.o.b. shipping point.

CAUSTIC SODA—Market continues tight, relief expected as new production arrives. Solid caustic soda is reported at $2.50 to $2.75 per 100 pounds; flaked and ground offered at $2.90 to $3 per 100 pounds, car lots, at works.

CHINA CLAY—Demand continues heavy, supply tight. Domestic filler clay is currently $8.50 to $9 per ton, car lots. Coating clay is $12 car lot and $16 less car lot. Imported clay is currently quoted at from $17 to $35 per ton, in car lots, export warehouse.

CHLORINE—Demand continues strong in a tight market. Lack of tank cars continues to hamper deliveries. Quotations unchanged. Chlorine is currently quoted at $2 to $3.50 per 100 pounds.

ROSIN—Gum rosin in drums, per 100 pounds, net, in yard New York, car lots, B, D, $8.75; E, F, G, H, I, K, M, $9.40; WG, $9.40; WW, $9.50; Wood Rosin, per 100 pounds, l.c.l. f.o.b. N. Y., B, $7.45; FF, $7.61; G, H, I, $8.15; WW, and X, $8.40.

SALT CAKE—Supplies show little improvement as demand continues to increase. Prices remain unchanged. Domestic salt cake is quoted at $20 to $26 per ton in bulk. Chrome salt cake is quoted at $20 to $26 per ton.

SODA ASH—Demand active as supplies continue short, previous orders filled. Contract orders prevail at the same high levels. Current prices, car lots, per 100 pounds, are as follows: in bulk, $1.08; in paper bags, $1.20; and in barrels, $1.60.

STARCH—Active demand absorbs capacity production, export demand slackened. Starch prices continue strong with the pearl grade quoted at $5.57 per 100 pounds; powdered starch at $5.68 per 100 pounds, car lots, Chicago.

SULPHATE OF ALUMINA — Active demand covered by fair supplies. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.30 per 100 pounds, in bags, car lots, f.o.b. works. Iron free is quoted at $1.95 to $2.25 per 100 pounds, in bags at works.

SULPHUR—Plentiful supplies to meet active domestic and export demands. Annual contracts are quoted at $16 per long ton, f.o.b. mines; the price f.o.b. at Gulf Ports is $17.50 per long ton.

TALC—Domestic and French grades are moving in fair volume with prices steady. Domestic grades are currently quoted at from $16 to $30 per ton at mines; Canadian at $35 to $45 per ton. All prices in car lots.

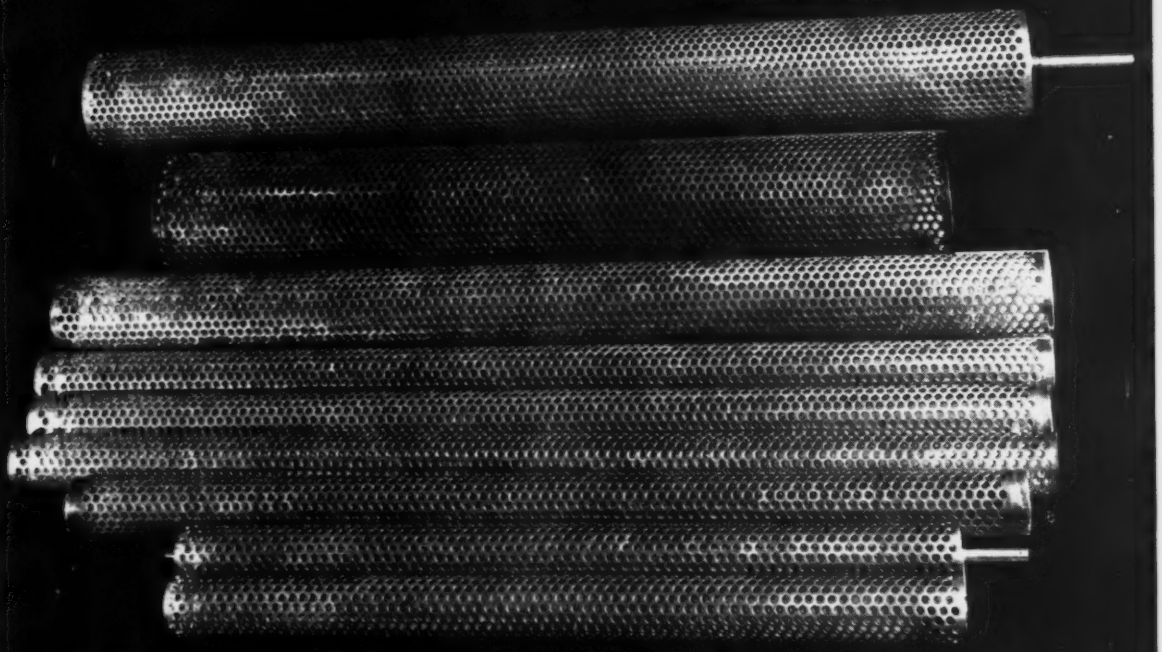
DO YOU NEED TOP-NOTCH PERFORMANCE FROM YOUR DISTRIBUTING ROLLS?

THEN BUY THEM FROM VALLEY!

BECAUSE . . . Valley pioneered the first use of distributing rolls in the U. S.!

BECAUSE . . . Valley's 26 years of pioneering know-how in the use, application, design and workmanship standards is unexcelled in the industry.

SO . . . Whether it's a distributing roll problem or simply a replacement distributing roll, think first of Valley!



VALLEY IRON WORKS COMPANY

APPLETON, WISCONSIN

How to Stop-Watch a Production Race

TIME the handling operations in your plant—then compare total handling time with total production time. If handling methods are obsolete, you'll find that handling is wasting much of the time saved by modern production machinery.

Cut the corners on handling operations — Towmotor Fork Lift Trucks and Accessories will do it for you — and you'll increase productive output and come out far ahead in the production race. A Pocket Catalog lists the Towmotor Fork Lift Truck or Accessory that will modernize handling in your plant . . . send for your copy now. Towmotor Corporation, Division 17, 1226 East 152nd Street, Cleveland 10, Ohio.

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Large stocks carried at all times, permitting prompt shipments

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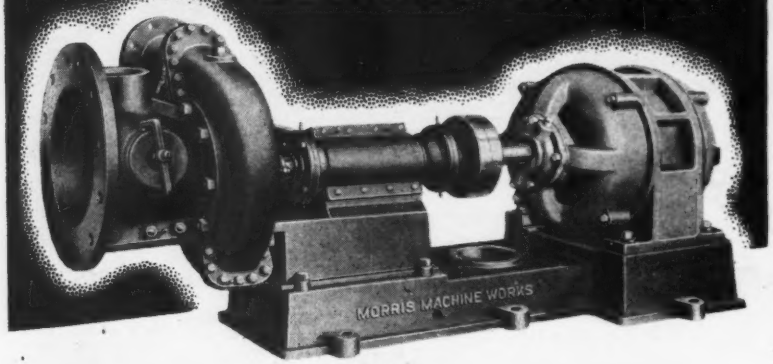
Simple Design Means...

SMOOTHER FLOW

FEWER SHUT-DOWNS

LONGER SERVICE



MORRIS CENTRIFUGAL STOCK PUMPS

THEY GIVE YOU

1. Less dehydration
2. More uniform flow without clogging or air binding
3. Reduced air-entrainment losses
4. Large reserve of excess capacity
5. Output more closely constant under varying heads.

THEY GIVE YOU LONGER SERVICE

1. Notice the bottom of the suction nozzle. Its horizontal position, flush with the eye of the impeller, eliminates upward incline. This feature discourages dehydration.

2. The bronze suction booster mechanically agitates and propels the fibre into the suction eye. This feature prevents extraction of water and consequent clogging of the suction pipe with dehydrated stock.

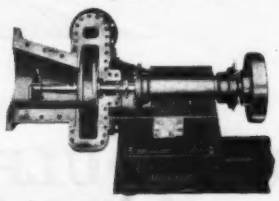
3. The horizontal top discharge nozzle permits rapid expulsion of air. The deep stuffing box insures long packing life.

4. Both the shape and proportions of the suction nozzle permit the intake of very heavy pulp into the impeller without restricting the flow or creating extensive friction losses.

Every feature of the Morris Centrifugal Stock Pumps, proved by performance in all kinds of paper mills, assures smooth flow of stock over a longer period of time . . . fewer shutdowns and replacements . . . longer life expectancy at less cost to you.

These pumps are efficient on clean Sulphite or Kraft stock as well as on waste paper or rag stock because of their non-clogging, non-binding characteristics.

Write Today for Bulletin 176



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MORRIS *Centrifugal Pumps*

Cyanamid's Lanaset Prolongs Felt Life

BOUND BROOK, N. J.—An increase in newsprint, paper and paperboard production is expected result from a new chemically treated type of papermaker's felt now on the market, according to American Cyanamid Company's Textile Resin Department. By processing felts with Lanaset resin, a melamine compound, using a technique developed by the Orr Blanket Company, the normal life of papermaker's felts has been substantially increased.

Lanaset resin has been used primarily to make wool fabrics washable, through control of shrinkage and felting. It has been known for some time, however, that the treatment had many other desirable effects. Laboratory tests had shown that processing with Lanaset resin increases resistance of fabrics to standard abrasion tests. It was this characteristic that led Orr to experiment with Lanaset resin for use in papermaker's felts.

Some mills have reported an increase in productivity, through the use of these new felts, as high as 15 per cent. To date the felts have been tested in such widely divergent types of mills as fine paper mills, kraft paper mills and paperboard mills.

Test runs in numerous paper mills have shown the new felts in many cases lasted more than twice the normal life of a felt. This longer life eliminates considerable "down-time" of machines required for the replacement of worn-out felts.

The new long life felts were produced by the Orr Company after a five-year search for a method of making papermaker's felts last longer. The answer to the problem was found in the Lanaset resin treatment of the long, endless belts of felt which are used in the mill to convey sheets of wet paper or paperboard while excess water is drained away.

Other industrial uses of Lanaset resin are now being studied by American Cyanamid Company.

Vancouver Forestry Products Reach New High in Value

VANCOUVER — Production value of British Columbia's forest industries achieved a new all-time high in 1946 with an all-inclusive figure of $173,-471,000. This represents an increase of $25,816,000, or approximately 17.5 per cent, over the 1945 figure which, in turn, was higher than in any previous year.

This large increase was primarily due to extensive advances in unit values over those of the previous year, although it also represented an increase in the total cut, of all products, of over one hundred million feet. In 1945, the grand total expressed in board feet, was 3,081,235 M.f.b.m. while the figure for 1946 is 3,193,665 M.f.b.m.

• PAPER—WOODPULP •

EXPORT **IMPORT**

OFFICES: GOTHENBURG · LONDON · SAO PAULO · BUENOS AIRES · RIO DE JANEIRO · SHANGHAI

ELOF HANSSON INC.

NEW YORK, U. S. A.

220 EAST 42ND STREET NEW YORK 17, N. Y.

Purchasing Agents See Signs Of Easier Market Conditions

NEW YORK — Purchasing agents of the Nation's industries, in their monthly survey of commodities, and matching their own experience against the facts that their suppliers tell them, this month find reason to be more hopeful, not only as to supply, but as to required qualities of most paper. In the bulletin of the National Association of Purchasing Agents for June evidence is presented from a survey of purchasing experience in many fields that the men who buy paper in large quantities are looking for the most part to an expected end of shortage. In a report prepared under the direction of T. A. Corcoran of the Courier-Journal and Louisville Times Company the members learned of one buyer who recently, for the first time in five years, rejected several carloads of fine paper. Newsprint is an exception, it is admitted, and some other grades are not as free as others.

Raw materials for book paper making are still in short supply, according to Ralph N. Betts of the American Education Press.

"Raw material inventories are still low at mills. This situation is particularly true of pulps. The Wisconsin area reports fairly well-filled wood lots.

"The higher grades of book waste have taken another price drop and the price averages around $42.50 per ton f.o.b. shipping point. Mills are showing some reluctance to make long-term commitments at current prices.

"Finished paper supply is showing no improvement at the present time in the book field. New demands are eating up any increased production. This condition will not improve until the aforementioned pulp increase becomes apparent. Ninety days is still close to the average for deliveries.

"As an aid to price, practically all mills continue to up-grade and eliminate the cheaper grades entirely.

"Book paper prices are still showing slight price increases, although most sources believe we are near the top."

On the other hand, E. E. McCulley, of the Courier-Journal Job Printing Company, declares: "There are many straws in the wind that indicate we are not too far away from a reasonable balance in supply and demand. In the rag grades of fine paper, most volume users are in a comfortable position, and those mills who have attempted to upgrade from 25 percent rag to 50 percent rag, however real and justifiable their reasons for so doing, have found that the volume user was able to get his tonnage placed somewhere else in the grade he wanted.

"It appears that saturation of the market for the higher grade rag sheets is a fact and that they are not moving. Historically, the volume use in the rag grades has been in the 25 percent rag class and there is now plenty of that to be had if your future looks interesting to the mill.

"In the sulphites, most volume users have been able to secure all of the No. 1 grade that they want. Historically, the volume in the sulphite grades has been in the No. 4 category. It appears that the saturation point on the No. 1 grade has been reached and that, as mills are unable to sell their entire production in the top grade, they will begin making, however, more tonnage in the lower grades.

"New production, in the form of extremely wide, high speed, low cost machines, is hanging over the market now, and it is probably only a matter of months or maybe weeks before this production will make itself felt.

"It is true that many of the non-integrated mills have been badly punished profit-wise by having to buy market pulp at prices some $40 to $60 per ton in excess of what they believe the pulp to cost the integrated mills.

"They cite the price of pulp, the increased labor and maintenance costs, as reasons to make a reduction in the price of paper impossible but, if and when their production cannot be moved at their asking price, reductions will be made.

"This present price structure in paper cannot be supported indefinitely and, as general business revalues its product, either willingly or unwillingly, so will paper follow. Again we say, any Utopian view of the future for the paper and related graphic arts industries that differs from the fortunes of general business substantially is just wishful thinking.

"Every indication now points to supply and demand being balanced before the end of the fourth quarter in the fine paper field, and perhaps sooner."

Stuart Edgerton, of the U. S. Rubber Company, finds that like other manufacturers of industrial materials, producers of kraft paper have increased and are attempting now to increase production, through modernization of machines and the addition of new equipment, but all purchasing men know how hard it has been to obtain deliveries of motors, gears, belts and other machinery parts. When this modernization of old equipment and the addition of new equipment begins to have its effect on the production of paper, then he expects not only additional supplies, but also, a much better quality.

"I believe," he adds, "it is the job of every purchasing agent to urge the suppliers to return to the furnishing of prewar quality paper as soon as possible. Certainly, we want to have a sufficient supply on hand first, and, as soon as we begin to approach that position, we should begin to insist on qualities that will equal or exceed our prewar standards.

"In talking prices, we should insist they be firm for immediate deliveries, and carry protection against decline for purchases to be delivered in three to four months. Some of the companies have insisted that the buyer sign a blank check for the paper needed at some future date.

"It does not take long for competitive conditions to appear once the supply lines are filled up, and while some suppliers, no doubt, will try to wring out the last bit of profit possible, knowing that we are over the peak of demand, we should and must insist that prices be based on costs and supply; these prices must inevitably follow the economic law."

Regarding boxboard, Edgerton declares the situation parallels to some extent the situation on kraft paper, but the inevitable change in the boxboard market will come sooner than the change in the kraft paper market, and it will be much more drastic in the case of boxboard. There is some easing in the boxboard situation right now, and it appears that we have passed the peak of demand.

Official price reports indicate that in the first quarter of 1940, chip was selling at $40 per ton, in 1945 at $50-$65 per ton, in 1947 at $77-$90 per ton, and there have been some purchases at around $100 per ton. This takes into consideration extras for size and tonnage. Single manila-lined board has gone from $54 to $90, while patent coated has gone from $72 to $115, and suit boxboard has gone from $54 per ton to $87.50. It appears that prices are in for a very considerable drop, so watch your inventories and place your forward commitments with protection against price decline.

There is a lot of improvement to be made in the quality of boxboard, he concludes.

Lee R. Forker, of the Quaker State Oil Refining Corp., declares paper containers should be more available during the balance of this year and for early 1948. The contemplated changes in our economy will have a direct effect on the box demand.

The "pipe lines" of all types of products using paper shipping containers are gradually filling, and we have all noted recently decreased demand for many items. General economic conditions are gradually getting in balance. At the present time, we can conclude that the balance of supply-demand ratio is approaching through a decreased demand rather than an increased supply.

In general, there is a change now in the demand and supply of supplies for box-making materials, showing a decrease in demand becoming more effective during third quarter of this year. Should this trend continue, with additional producing facilities and increased import of supplies from Canada and the Scandinavian area, then inventories and working stocks will increase.

YOU NEED MORE THAN THIS ⇨ TO CAST LONG SERVICE ROLLS

Specialized equipment is only part of what it takes to give you rolls that provide maximum paper-making service. The other *vital* factor is *experience.*

Farrel has accumulated this experience over almost a century of roll making. From this has come the skill and knowledge needed to give every calender roll a clear, hard, chilled surface, *with the skin of sufficient depth to provide maximum wear but not so deep as to detract from the strength of the roll.*

This chilled skin provides an extremely hard, wear-resistant surface capable of taking and holding a smooth, mirror-like finish. The roll strength lies in the gray iron structure below the chill.

In *America's largest specialty roll shop* at Ansonia, Farrel has the experienced skill and specialized equipment to produce rolls from 5" to 72" in diameter and up to 312" face, ground round and straight to close tolerances, or crowned with the correct shape for specific purposes and operating conditions.

You can get full information on rolls for any purpose, complete calender stacks, roll grinders and roll calipers, promptly, on request.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
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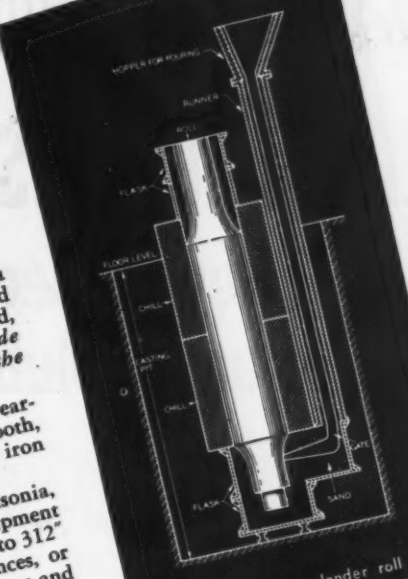

The body of a calender roll is formed by pouring molten metal into an iron mold or chill. Iron being a good conductor of heat, cooling is rapid, causing the surface of the roll body to "chill" and harden. The body of the roll below the chilled surface cools slowly, forming a gray iron structure which gives strength to the roll. Sand molds are used for the necks, and since sand is a poor conductor of heat, the metal becomes a gray-iron composition, with physical properties which make the necks strong, yet readily machinable.

FARREL PAPER MILL MACHINERY

ROLLS: Chilled Iron, Dry Sand, Meehanite, Alloy Iron, Steel, Chromium Plated
FOR: Calender Stacks, Board Calenders, Super Calenders, Glassine Calenders, Friction Rolls, Breaker Rolls, Smoothing Rolls, Coating Rolls, Creping Rolls, Plater Rolls, Cutting Rolls, Paraffining and Waxing Rolls, Saturating Rolls, Silicating Rolls, Miscellaneous Special Purposes
CALENDERS: Paper and Board
GRINDING MACHINES: Roll
CALIPERS: Roll
GEARS, CUT: Spur, Single and Double Helical (Farrel-Sykes Continuous Tooth Type)
SPEED REDUCING GEAR UNITS
SPEED INCREASING GEAR UNITS
FLEXIBLE COUPLINGS

Farrel-Birmingham

FB-397

COATED PAPER MILLS REPORT...

Important Benefits from use of Nopco* ESI

New Aqueous Dispersion of an Insoluble Metallic Soap

DATA BASED ON RECENT SPOT CHECK ANALYSIS OF MILLS USING NOPCO ESI IN VARIOUS PARTS OF THE COUNTRY.

Other Known Advantages

Applicable in either conventional coating or paper machine coating process.

May be used in either *casein* or *starch* coatings.

Readily diluted in water to any desired concentration . . . gives a dispersion stable to both mild acids or alkalis.

Thoroughly plasticizes pigment particles even after coating has dried . . . important for eliminating a troublesome dusting problem.

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FIRST MILL... *4 benefits reported* . . . (1) improved brightness and gloss on paper machine operations; (2) improved flow characteristics; (3) uniformly smoother coating; (4) reduction of dusting problems at calender stack.

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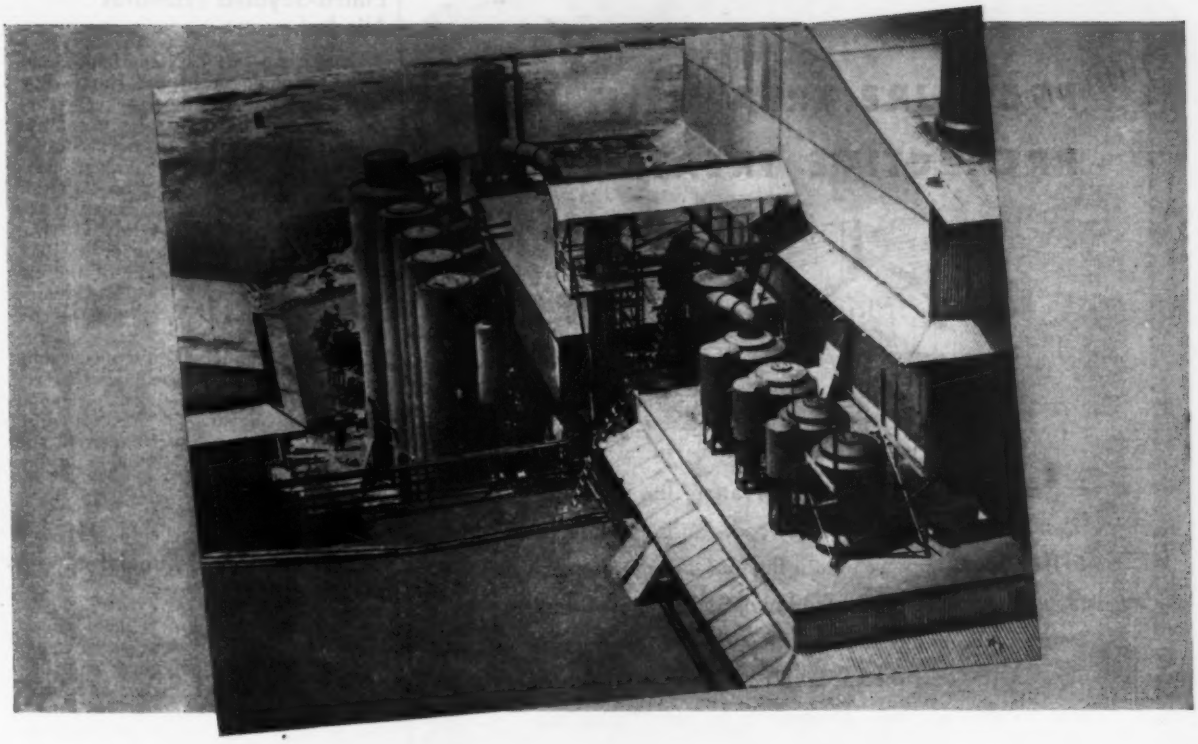

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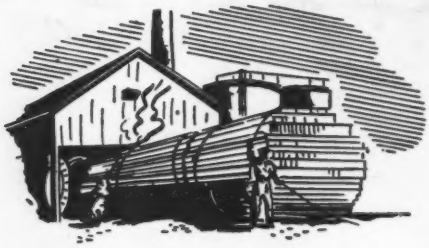

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Harris-Seybold Promotes Niederhauser

CLEVELAND—R. J. Niederhauser, advertising manager of the Harris-Seybold Company for the past two years, has been promoted to sales promotion manager in charge of market study and advertising. Mr. Niederhauser joined the Harris-Seybold organization in 1939 as a research engineer at the Seybold Division in Dayton. He was promoted to project engineer in 1941, and to production manager of the Instrument Division in 1944. He became Harris-Seybold advertising manager in 1945.

C. D. Harmon has been named public relations director. He will also be responsible for Harris-Seybold Chemical Division advertising. J. A. Petrequin, a member of the sales department for the past year, has been added to the Sales Promotion staff.

Resinous Products Booklet Describes Plasticizers

PHILADELPHIA—A new booklet on the properties of certain plasticizers and modifiers for polyvinyl chloride, the vinyl copolymer resins and elastomers of the acrylonitrile - butadiene type is now being made available by the Resinous Products & Chemical Company. Discussing two of the company's important plasticizing resins, Paraplex G-25 and G-40, the booklet provides valuable information on the properties of these non-migrating resinous polyesters and their use in such industrial applications as free films, extruded compounds, cable lacquers, fabric and paper coatings, gasket stocks, can linings and closures, and cements and asphalt compounds.

Foreign Visitors Inspect Norton Company Plant

WORCESTER, Mass.—Portugal, China and Australia are represented in a group of men learning U. S. production "know-how" in a training visit at Norton Company plant. Three are employees of foreign distributors of Norton products. The fourth is an engineer with a subsidiary corporation of National Resources Commission of China.

William J. McGrogan

WISCONSIN RAPIDS, Wis. — William J. McGrogan, 72, retired paper mill engineer, died June 7 at the home of his son Adrian in Milwaukee, with whom he had been residing recently. He lived in this community from 1909 to 1945. He came to Nekoosa in 1909 as assistant to the chief engineer of the Nekoosa-Edwards Paper Company. In 1913 he became operator of the Centralia pulp and water power plant, remaining there until his retirement four years ago.

Today, in many parts of the world, there are permanent, well-stabilized markets in urgent need of the paper and board produced in this country.

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DIGESTED

Education will have to express itself not only in individual conduct but in group action and in public policy. It will have to find such effective expression in the United States that there will be faith and material strength both here and in other places in the world to swing the balance for peace and for the personal freedoms.

The first obligation of a businessman is to run a successful business, but he must also recognize his obligation toward making the enterprise system serve the nation successfully. As a part of this concern, he must recognize the necessity for reducing the instability as well as increasing the productivity of the economy.

To implement his responsibility, he must strive to understand the consequences to the economy of the choices of policy and action which are open to him; and also, because of their interdependence, to understand and appraise the courses open to other policy-makers, public and private.—RAYMOND RUBICAM *from an address at Colgate University.*

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1947		Corresponding Weeks—1946	
May 3	107.5	May 4	107.3
May 10	107.9	May 11	102.8
May 17	105.3	May 18	98.3
May 24	105.1	May 25	99.2
May 31 (Revised)	105.6	June 1	96.3
June 7	*104.4*	June 8	104.0

COMPARATIVE MONTHLY SUMMARIES

1946							
Jan.	94.7	June	104.6	Dec.	97.0	March	106.1
Feb.	98.4	July	94.0	Year Avg.	101.1	April	105.1
March	104.4	Aug.	104.7			May	*106.2*
April	102.7	Sept.	101.3	1947		(Revised)	
May	100.7	Oct.	106.4	Jan.	102.1		
		Nov.	105.5	Feb.	105.9		

COMPARATIVE YEARLY SUMMARIES

	1940	1941	1942	1943	1944	1945	1946	1947
Year to Date	86.6	92.8	100.3	88.9	88.4	88.8	100.0	*105.3*
Year Average	85.6	97.4	90.4	87.8	88.1	89.4	101.1	

PAPERBOARD OPERATING RATIOS†

Current Weeks—1947		Corresponding Weeks—1946	
May 3	102	May 4	101
May 10	101	May 11	97
May 17	102	May 18	92
May 24	101	May 25	93
May 31	98	June 1	85
June 7	*98*	June 8	96

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Year Avg.
1946	90	91	100	99	94	97	89	99	96	100	99	92	96
1947	99	103	101	100	*101*								

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

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EDITORIAL

Autocrat at the River's Edge

To place the fate of a 3¼ billion dollar industry in a position where it is dependent on the judgment—not to say the whim—of a single man is a proposal that ranks with the most autocratic projects of Bureaucracy at its most ambitious development. Yet that is precisely the effect of legislation which E. W. Tinker appeared to protest against last week in Washington, when a bill was before the House Public Works Committee that would give the Surgeon General that much power to close up the Nation's paper mills if he finds objectionable stream pollution. For his opposition, which came as a natural course, but particularly for his emphasis on the arbitrary nature of the powers to be conferred on a single government agency. Mr. Tinker has served more than one purpose. He has directed the attention of a wider audience to the effect of the proposed legislation. For, beyond the sizable industry which he identified in his presentation, there is the vast network of other industries which are dependent on paper who could be affected. And, as he pointed out cogently, from the very nature of the industry there are large numbers of small towns and villages, dependent mainly on the local industry, who are even more intensely interested in the problem of which stream pollution is but one phase. Another side, and probably to people in the mills an even more important one, is to keep the mills running so that a community may live.

Each of the bills before the Committee provides that when, in the opinion of the Surgeon General, pollution of interstate waters is such as to jeopardize the health or welfare of the citizens of the United States he shall, in effect, direct state authorities to take remedial action, and, failing action by the state, cause suit to be brought in the name of the United States for abatement. The effluent from pulp and paper mills does not constitute a menace to the health of citizens of the United States, Mr. Tinker pointed out, adding "We have no way of knowing how the Surgeon General might regard them in relation to public welfare which, as the Committee knows, is a very expansive phrase. Certainly the public would prefer unpolluted to polluted streams if that were the only consideration involved, but I cannot emphasize too strongly the statement that it is not alone a question of public versus corporate interest. The public also wants paper. The public is interested in both sides of the question and, as to any individual plant, that segment of the public which is dependent on operation of the plant for jobs, their business or the sale of their raw materials (wood from nearby farms for example) is the one most vitally interested in the manufacturing plant and commonly the one most concerned with the stream pollution. There is nothing to indicate that the specialists on stream pollution, who would make their reports to the Surgeon General, would be competent to evaluate these conflicting interests, or to determine the economic feasibility of abatement. On the contrary, there is every indication that the Surgeon General, having formed the opinion that the pollution is a thing offensive to the public welfare, could and might bring the offender into court to defend not only its own interest but also the interest of the community or the state in which it is located.

Opposed to this, Mr. Tinker submitted that the state and local interests are paramount in the great majority of cases, and that interstate problems can ordinarily be settled through state agreements. "We do not believe," he added "that the Congress should depart from this principle except on petition from the legislative bodies of one or more of the states concerned. The legislation here proposed would give a single appointed, federal official authority to prosecute citizens of the United States for acts which *in his opinion* are inimical to the public welfare and, in so doing, to overrule state authorities who have not responded to his request to bring such suits. We do not believe that is desirable, and we do not believe it is workable."

Valued Merchandise

To at least one customer of the newsprint mills a hearty congratulation is extended, not only for the high appreciation of the material which he buys but for the extreme measures which he has taken to conserve so much of its value as lies within his power to control its course from the mill to the reader of the printed matter which he imprints on it. This publisher has discovered, to his own satisfaction at least, that he can prevent damage to the rolls as he receives them, and he goes to the extent of supervising their unloading with this precaution in mind. From the time that the freight car is opened at its siding in his town until the paper comes off the press a member of his pressroom crew is always and actually in charge. The paper is never handled by an outside crew either in the unloading or in the warehouse, or in any other place, or any other movement of the paper. The publishers report that damage in the cars was particularly severe "during the latter part of the war period and the first part of the postwar period." However, by contacting newsprint mills, it was in many instances possible to have installed a shock recording device in the cars which has enabled some publishers to determine where the cars had rough handling en route. In that way, some newsprint users were able to spot the trouble and avoid much of it.

W. L. Cook

EDITOR

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122 E. 42nd ST., NEW YORK 17, N. Y. Edited By R. G. MACDONALD, Secretary

Use of Ottawa Test Sand in the Evaluation of Sealed Flexible Packages*

By L. C. Cartwright

Abstract

Ottawa test sand, which is clean, free-flowing, free from sharp edges, and uniform in gas-space volume, neither absorbs nor reacts with ordinary gases, is particularly suitable for filling either gas-packed or vacuum-packed flexible packages to determine their effectiveness in protecting their contents from atmospheric oxygen. Determination of the amount and composition of gas in such test packages after suitable periods of storage under controlled conditions permits calculation of the permeability of the packaging material to oxygen, or to other gases, and of the expected shelf life of the packages for any given maximum permissible entry of oxygen. Application of the method to the evaluation of a number of packaging materials for the vacuum-packing of coffee is illustrated by data, calculations, and interpretation.

Flexible sheet materials, especially laminated combinations of paper and plastic film, or of paper, metal foil, and plastic film or coating, are finding an increasing use in the production of hermetically sealed packages for dried food products and other products requiring protection against atmospheric oxygen and moisture. In selecting the packaging material for a particular application, knowledge of the water vapor and oxygen permeabilities of the various sheet materials under consideration is obviously essential, and much attention has been given to methods of determination of these permeabilities under various conditions. The TAPPI methods for water vapor permeability are in general use, and a number of papers have been published recently on the determination of the gas permeability of sheet materials *(1, 2, 3, 4, 5)*.

In evaluating sheet materials for use in sealed flexible packages, it is essential to know not only their permeabilities, but also the effect of folding and creasing on those permeabilities, and the tightness of the seals, usually heat-seals, made in the package. Both of these problems have been recognized, and the TAPPI method for creasing sheet materials before determining water vapor permeability is widely used. It is also common practice to include sections of heat-seals in some of the test specimens used for water vapor or gas permeability determinations.

Permeabilities of Actual Packages

These means are very useful in the general evaluation of flexible sheet materials for use in hermetically sealed packages. However, for the specific problem of evaluating a given size and style of package made on a particular machine, there is no satisfactory substitute for the direct determination of the rates of entry of water vapor and oxygen into actual test packages made on the machine as nearly as possible under the conditions of commercial operation. This is especially true of oxygen entry into flexible vacuum packages, where the tiniest leak in crease or seal permits rapid entry due to the large pressure differential, and only slightly less true for products packed in an inert gas, since the partial pressure differential of oxygen is still large.

It is often feasible to determine the rate of water vapor entry into a sealed flexible package by the simple expedient of storing the package under specified test conditions of temperature and relative humidity and weighing it at suitable intervals. If the contents be relatively hygroscopic, as is usually the case with products, such as dry, whole milk, which especially require protection against atmospheric moisture, an appreciable weight of water can be absorbed without significantly increasing the equilibrium water vapor pressure inside the package. In that case, after an initial period during which the outer surface of the package comes to equilibrium with the test atmosphere, and a steady water vapor pressure gradient through the package wall is established, a substantially constant rate of weight increase will be found which represents the rate of water vapor entry into the package. In most cases, this rate can be readily verified by a determination of the total moisture content of the packaged product at the time of packaging and again at the end of the test.

Evaluation of actual sealed flexible packages with respect to rate of entry of atmospheric oxygen is much more difficult. Ordinarily, the weight of oxygen that may be permitted to enter the package without injury to the contents is much too small for accurate determination by direct gravimetric means. Similarly, the amount of oxygen that enters during a reasonable

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24-27, 1947.

[1] Member TAPPI; Research Director, Foster D. Snell, Inc., New York 11, N. Y.

test period cannot ordinarily be determined, or even detected, by any simple chemical analysis of the packaged product.

Any attempt to determine the rate of oxygen entry into a sealed flexible package of a product sensitive to oxygen by analysis of the gas content of the package after a suitable test period of exposure to atmospheric oxygen under specified conditions is complicated by the fact that an indeterminate, but usually large, percentage of the oxygen entering the package is absorbed by or reacts with the packaged product. This difficulty can be overcome by making the test packages as nearly as possible under conditions of commercial production, but filling them with an inert material, which will neither absorb nor react with significant amounts of oxygen, instead of with the oxygen-sensitive product to be packaged.

Ottawa Test Sand in Test Packages

Standard Ottawa test sand, ordinarily used in the laboratory evaluation of concrete mixes, is partciularly suitable for filling test packages to determine the rate of entry of atmospheric oxygen. It is clean and easy to handle in filling the packages, it is quite uniform in bulk density and gas-space volume, it does not absorb significant amounts of oxygen or other atmospheric gases, and its grains are smooth and round so that they do not scratch or cut the packaging material. This latter characteristic is of particular importance in the case of flexible vacuum packages, where the packaging material is pressed very firmly against the packaged product, and sharp edges or points might puncture the package.

Ottawa Test Sand, being substantially pure quartz, has a true density at 25°C. of 2.65 g./cc. In the 50 to 70 mesh size, which is very convenient to use in test packages, its apparent or bulk density is quite consistently 1.62 g./cc. Each gram of such sand in the package occupies a total volume of 0.62 cc. of which 0.38 cc. is solid sand and 0.24 cc. is gas-space volume. Thus, in a flexible vacuum package of such sand, where the package walls are held firmly against the sand by external air pressure, the gas-space volume in the package may be calculated directly from the weight of sand. In a package filled with nitrogen, or other inert gas, even though the package may have been filled completely with sand and sealed at or slightly below 1 atmosphere of inert gas pressure, if atmospheric oxygen permeates into the package faster than inert gas permeates out, the gas-space volume in the package may be greater than that calculated from the weight of sand as above. In that case, the total volume of the package may be calculated from its dimensions, or determined by displacement of rapeseed, or by other means, and the volumes of the package material and the solid sand subtracted to obtain the gas-space volume.

Evaluation of Test Packages

In evaluating either gas-packed or vacuum-packed sealed flexible packages with respect to the protection afforded their contents against entry of atmospheric oxygen, several test packages are made as nearly as possible under commercial conditions, except that they are filled with Ottawa test sand instead of the product to be packaged. The sand should, of course, be clean and dry, and for very accurate work, especially if the packaging material is substantially impermeable to water vapor, the sand should be oven-dried before packing.

All of the test packages are inspected for uniformity of internal gas pressure or vacuum immediately after packing. This is most conveniently done, without injury to the packages, by the bell jar method *(6)*. The amount and the composition of gas in at least one or two packages are determined. A method for such determinations has been described *(6)* by the author. The remaining packages are then stored in air under suitable controlled conditions of temperature and humidity. For an accelerated test of oxygen entry, they may be stored in an atmosphere of pure oxygen.

The internal pressure is checked from time to time. Any significant variations in rate of pressure change among similar test packages is presumptive evidence of leakage through pinholes or seals, while a uniform rate of pressure change for all similar test packages is practically conclusive evidence that the entire change is due to gas permeation. After a suitable test period, determined by a significant change in gas pressures within the packages as indicated by the bell jar method, two or more packages are examined for amount and composition of gas. As a further check, such determinations may be run on additional packages after a still longer test period.

Method of Calculation

Consider the case of oxygen entry into a package, either gas-packed or vacuum-packed, which is free from pinholes or leaks, so that the oxygen enters only by permeation through the sheet material of which the package is made. The rate of oxygen entry is directly proportional to the area of package material, to the oxygen permeability of the material, and to the difference between the external and internal oxygen pressures. For a given test package under given conditions, the first two are constant, but the oxygen pressure differential decreases as oxygen enters the package, and the rate of entry decreases correspondingly.

The mount of oxygen in the package at any time is $V=PV_o$, where V is the volume in cubic centimeters of oxygen in the package, corrected to 1 atmosphere, P is the partial pressure in atmospheres of oxygen in the package, and V_o is the gas-space volume in cubic centimeters in the package. The rate of entry of oxygen into the package is $dV/dD=RA\ (P_x—P)$, where D is time in days, R is the oxygen permeability of the packaging material in cubic centimeters per square meter per day for 1 atmosphere oxygen pressure differential, A is the area of the packaging material in square meters, and P_x is the external oxygen pressure in atmospheres. Therefore, $dP/dD=RA\ (P_x—P)/V_o$, whence $ln\ (P_x—P_1)—ln\ (P_x—P_2)=RA\ (D_2—D_1)/V_o$.

This relation permits calculation of the oxygen permeability of the packaging material from data on the oxygen content of the package at the start and after a suitable test period. Conversely, when the oxygen permeability is known, it permits calculation of the amount of oxygen that will have permeated into the package by any specified date under given storage conditions. Incidentally, the same type of relation holds for permeation of any other gas, either into or out of the package, depending on the partial pressure differential of the particular gas, and independently of whatever other gases may be present, so long as they do not affect the permeability of the packaging material by their presence.

Experimental Results

The method has been applied effectively to packages

of various sizes, shapes, and sheet materials, both gas-packed and vacuum-packed. The results obtained on a series of packages made to evaluate a number of sheet materials for the vacuum-packing of coffee with respect to the protection they would afford against entry of oxygen will serve as an illustration.

These packages, designed to hold one pound of regular-grind coffee, were approximately 2.5×4.9×4.9 inches in dimensions. The effective sheet material area per package was 113 sq. in., or A=0.073 sq. m. The packaging materials used were: I. Bleached kraft laminated to 0.005 inch aluminum foil, with a 0.001 inch heat-seal coating of a polyvinyl butyral composition on the foil; II. Same as I, except the heat-seal coating, which was 0.0002 inch of a nitrocellulose composition; III. 300 MAT cellophane laminated to 120 N Pliofilm; IV. P88 cellulose acetate laminated to 120 N Pliofilm; V. Bleached kraft coated with a 0.002 inch heat-seal coating of a polyvinyl butyral composition. Six test packages of each sheet material were filled with 1600 grams of 50 to 70 mesh Ottawa test sand each, vacuumized to approximately 29 inches, and heat-sealed.

For each package, V_o=0.24×1600=384 cc. All of each group of packages, checked by the bell jar method immediately after packing, showed approximately 28.5 inches vacuum. Two of each group were examined at once for gas content and composition, and each of these was found, within the limits of experimental error, to contain 3.8 cc. oxygen and 15.2 cc. nitrogen, corrected to 1 atm. at 25°C. Thus, P_1 for oxygen = 0.010 atm. and P_1 for nitrogen = 0.040 atm.

Two packages of each group were stored in air at 25°C., 50% R.H., and two of each group were stored in oxygen at 1 atm., 25°C., 50% R.H. Bell jar vacuum determinations were run on the packages at increasing intervals, and packages were removed for determination of gas content and composition as indicated by the bell jar readings. The bell jar readings were as follows:

BELL JAR VACUUM IN INCHES OF MERCURY

Days storage	2	5	10	20	50	100
In air:						
Ia	28.5	28.5	28.5	28.5	28.5	28.5
Ib	28.5	28.5	28.5	28.5	28.5	28.5
IIa	27.5	26	23.5	...	...	...
IIb	0	...	...	...	...	...
IIIa	28.5	28	28	27.5	26	23.5
IIIb	28.5	28	28	27.5	26	...
IVa	28.5	28	27.5	26	23	19.5
IVb	28.5	28	27.5	26	23	...
Va	27.5	25.5	23	19.5	12	...
Vb	27.5	25.5	23	...	...	...
In Oxygen:						
Ic	28.5	28.5	28.5	28.5	28.5	28.5
Id	28.5	28.5	28.5	28.5	28.5	28.5
IIc	28.5	28.5	28.5	28.5	28.5	28.5
IId	15	...	...	...	...	...
IIIc	28.5	28	27.5	26.5	23.5	19.5
IIId	28.5	28	27.5	26.5	23.5	...
IVc	27.5	26.5	24.5	21	13	...
IVd	28	26.5	24.5	21	...	...
Vc	25.5	21	15	8	...	...
Vd	25.5	21	15	...	...	...

Each package was examined for amount and composition of gas on the day on which the last bell jar vacuum entry appears for it in the above tabulation. The packages which showed no change in bell jar vacuum were each found to have 3.8 cc. oxygen and 15.2 cc. nitrogen, the same values found for the packages examined immediately after packing. Packages IIa, IId, and IIb obviously had leaks, of increasing magnitude in the order named, and were not examined for gas content and composition. The remaining packages showed uniform rates of pressure change for duplicates stored under the same conditions, indicating that they were free from leaks and that their pressure changes were due to gas permeation through the package walls. The results of the gas analyses on these packages on the days indicated were as follows:

Pack		Total Gas	Oxygen				Nitrogen			
No.	Day	cc.	%	cc.	atm.	R	%	cc.	atm.	R
IIIa	100	84	32	27	.070	20	68	57	.148	8
IIIb	50	53	30	16	.042	20	70	37	.096	8
IIIc	100	140	90	126	.328	20	10	14	.036	6
IIId	50	84	82	69	.180	20	18	15	.039	3
IVa	100	136	45	61	.159	81	55	75	.195	12
IVb	50	90	48	43	.112	81	52	47	.122	12
IVc	50	220	94	206	.536	80	6	14	.036	12
IVd	20	115	87	100	.260	77	13	15	.039	8
Va	50	230	32	73	.190	310	68	157	.409	70
Vb	10	88	41	36	.094	308	59	52	.135	71
Vc	20	287	96	275	.715	328	4	12	.031	68
Vd	10	194	93	180	.469	328	7	14	.036	60

Interpretation of Results

The general conclusions from these data were that packaging material I would give substantially complete protection against atmospheric oxygen as long as the packages were well sealed and free from breaks, material II was unsatisfactory because of faulty and erratic heat-sealing properties, and materials III, IV and V would give some measure of protection, decreasing in the order named.

It had been established that freshly roasted and ground coffee would absorb and react with considerable amounts of oxygen, and that this would result in staling of the coffee. A limit of 3 cc. of oxygen per 100 grams of coffee or 14 cc. per pound, had been set as the maximum permissible entry of atmospheric oxygen into the packages during their expected shelf life.

In calculating the expected shelf life of coffee in the above packages, it was assumed that the oxygen entering the packages would be absorbed substantially as fast as it entered. Thus, the rate of entry would not fall off logarithmically, as it does with sand in the packages, due to decreasing oxygen pressure differential. On this basis, the expected shelf life of the above coffee packages is given by D=14/0.2RA=960/R, where R is the oxygen permeability of the material. Using the average R values of 20, 80, and 320 for the materials III, IV, and V, their expected shelf lives were found to be 48 days, 12 days, and 3 days, respectively, while it was judged that material I would give substantially permanent protection against oxygen.

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New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Richard T. Trelfa, Technical Service Engineer, Paper Makers Chemical Department, Hercules Powder Co., Kalamazoo, Michigan, a 1941 graduate of the University of Michigan.

Arthur G. Veiga, Engineer, F. Johnsson & Cia., Rio de Janeiro, Brazil, a 1944 graduate of Escola Nacional de Engenharia da Universidade do Brasil.

Curtis S. Walseth, Graduate Student, The Institute of Paper Chemistry, Appleton, Wisconsin, a 1941 graduate of Iowa State College.

Study of Certain Factors Affecting the Filtration of Smoke by Fibrous Materials*

By Jules J. Perot, Jr.[1]

Abstract

In order to provide fundamental information necessary for the improvement of fibrous filters in military and industrial masks, a study was made of the mechanism of aerosol filtration and of the choice and processing of fibrous materials for use as air filters.

The filtration was found to be due primarily to mechanical effects. No type of fiber tested showed any unusual affinity for the test aerosol, and examination of the fibers under the electron microscope suggested that the particles collected on a fiber were uniformly distributed over its surface.

The most important factor governing the choice of a fiber for aerosol filtration appeared to be fiber diameter. Filtering efficiency was found to increase with decrease in fiber diameter.

A study of fiber processing revealed that, at constant sheet weight, filtering efficiency was dependent upon sheet density. Moreover, this relationship appeared to be independent of the type of processing used to vary fiber density. For maximum filtering efficiency an optimum sheet density, as well as an optimum sheet weight, was found to exist for each type of fiber.

The addition of small amounts of certain fillers, such as asbestos and diatomaceous earth, was found to increase filtering efficiency.

This study of the choice and processing of materials for use as air filters was undertaken primarily in the hope of developing information which would contribute to the improvement of the air filter in the military gas mask and, as a secondary consideration, to the improvement of the air filter in industrial masks.

During World War I the development of war gases was of necessity closely paralleled by the development of protective masks. This race between the development of new combat gases and the development of means of protection brought about the evolution of a military mask containing a filter of fibrous material for the removal of suspended particles. (aerosols), as well as a canister of activated charcoal for the removal of toxic material present in gaseous form. The advent of World War II emphasized the need for a better understanding of the factors governing the efficiency of fibrous air filters.

The requirements of filters for military and industrial masks differ widely in some respects but are the same in others. Both types must have a low resistance to passage of air. This is of primary importance because the protective devices must be compact enough to offer little hindrance to physical activities and, at the same time, must offer little resistance to breathing.

The military filter must remove quantitatively any aerosol which it encounters. Cost, length of life, and ease of replacement are of secondary importance. The industrial filter, on the other hand, does not demand quantitative removal and may be designed to protect against a specific aerosol. Cost, length of life, and ease of replacement are of more importance than in the case of the military filters.

Very little has been published on the subject of air filters. This is to be expected, in view of the fact that all development has been either by military or commercial manufacturers of filters. A few general articles of a nontechnical nature have appeared (*1-5*).

The only technical publication available on this subject is that of Kaufmann (*6*). His investigations were made on pads of cotton, artificial fibers, and filter paper. Flue gases and quartz dust were used as aerosols. He stated that the efficiency of filtration increased with decreasing diameter of the fibrous material and with increasing particle size of the aerosol.

Little is known of the actual mechanism of filtration of aerosol by fibrous materials. It should be noted that the filtering action has never been attributed to a sieving action on the individual particles. Such an effect is hardly credible if one considers the relative sizes of the particles and of the openings in the sheet. The particles are often as small as 10-16 mm. in diameter (*7*), whereas the microscopically observed openings in a fibrous sheet are of much greater magnitude. Sieving can enter only after the agglomeration of the primary particles into relatively large clumps.

The agglomeration of particles has been attributed by Kaufmann (*6*) to three primary effects: (1) compression or constriction of lines of flow allowing collision of particles with each other, (2) collisions between particles resulting from Brownian movement, and (3) electrostatic effects of charges on the aerosol particles.

Because of the structure of the passages through the sheet, they might be likened to the interstices of a compressed brush heap; the particle-laden air is forced to follow tortuous paths, changing direction of flow as the passages change direction and size. The changes in the size of the passage from point to point result in changes in the velocity of the air relative to the surrounding fibers and increase the probability of collision and agglomeration of aerosol particles.

Considering the size of the particles and the relatively large dimensions of the passage, it seems likely that the principal effect of Brownian movement would be to cause collision and agglomeration of the particles rather than to cause collisions beween particles and fiber surfaces.

Gibbs (*8*), as well as Kaufmann has suggested that electrostatic charging of the particles would increase the ease of filtration. In the case of an air filter, any charges on the particles are probably due to collisions between particles and between particles and fiber surfaces.

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 24, 1947.

A portion of a thesis presented in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wisconsin, May, 1943. This works was carried out under the direction of George R. Sears.

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The deposition of agglomerated particles seems, for the most part, to be due to mechanical effects. In explaining why a suspended particle tends to settle upon a solid surface with which it is brought in contact, Gibbs has stated: "In many cases it is probably due to the fact that the layer of dusty gas in close contact with the surface is traveling very slowly, and the particles are arrested and held by the roughness of the surface. To some extent, also, gravitational forces, acting under these conditions draw the particles to the surface. Where the local irregularities of the surface are such as to maintain local eddy currents at the surface, these currents will tend to deposit dust by centrifugal action."

The minute surface irregularities of the cellulose fibers probably aid in the filtering action, because they provide a large surface for the deposition and retention of precipitated particles. Moreover, they further subdivide the lines of flow through a fibrous pad and thus assist in the preliminary agglomeration of particles. These irregularities would also be electrostatically charged by collision of particles if such an effect exists.

Because the air permeability of the filter is of great importance, some attention should be given to the rather extensive literature on this subject. Unfortunately, the major portion of the reported work has been carried out on the regular grades of paper which are of such low permeability as to be totally unsuited for use as air filters. The more important of the large number of methods and instruments for measuring the porosity of paper have been summarized and described by Lane (*9*). Lane used a permeability instrument patterned after that of Carson (*10*) and studied the effect of some of the papermaking variables on the porosity of paper. His results showed that the air permeability of paper was increased very slightly by the addition of rosin size or by the addition of fillers, and was decreased by beating.

Sullivan and Hertel (*11, 12*) have done some very interesting work on the air permeability of pads of fibrous materials, using glass fibers oriented parallel and perpendicular to the line of flow. The latter case is roughly analagous to the flow of air through paper. They concluded that, at constant solid fraction of the pad and constant driving force, the air permeability decreases as the specific surface of the fibrous material under test increases.

The present investigation describes the effects on filtering efficiency of the papermaking variables such as beating, degree of wet pressing, use of fillers, sheet weight, sheet density, and sheet caliper. To facilitate the logical selection of a fibrous raw material for use as an air filter, the effects on filtering efficiency of fiber length, width, shape, and surface characteristics were examined.

Test Methods

Measurement of Filtering Efficiency with the Penetrometer

The instrument used in this investigation to measure the filtering efficiency of the various fibrous materials was a penetrometer similar to that developed by Hill (*13*). A schematic diagram of the instrument is shown in Fig. 1.

Briefly the instrument operates as follows: An aerosol (smoke) is produced by the combustion of synthetic natural gas under controlled and reproducible conditions. The efficiency of removal of this aerosol and the resistance to the flow of air through the test specimen are measured simultaneously and continuously.

In more detail, the operation of the penetrometer was the following: Gas flowed to the burner B through valve V_2 at a rate measured by the flowmeter F_1. The equilibrium smoke concentration in the chamber S was determined by the rate of flow of gas to the burner and by the rate of removal of smoke through the rest of the apparatus. With stopcocks C_1 and C_4 open and C_2 and C_3 closed, the rate of flow of air through the system was adjusted by means of valve V_1 to a value of 42.5 liters per minute as measured by the flowmeter F_2. The electrostatic precipitator E_1 removed dust from the air as it was drawn from the room and through apparatus. When the system had been washed out with this clean air, stopcock C_3 was opened and C_4 closed; the air thus passed through the specimen at D on its way to the absorption tube T_1. The absorption tube T_2 was identical with T_1, except that it was sealed. Light from the lamp L passed through both absorption tubes to the photocells. The difference in the photocurrents was amplified and read on a milliameter which was part of the amplifier circuit. With clean air passing through the system, an adjustment was made to cause the meter to read zero. The pressure drop across the specimen was read from manometer M. Stopcock C_4 was opened, C_3 closed, C_2 opened, C_1 closed, thus drawing smoke-ladened air from the chamber S through the system without passing it through the specimen. The amplifier was then adjusted to cause the meter to read 100 for this maximum smoke concentration in absorption tube T. Stopcock C_3 was opened and C_4 closed to pass the smoke through the specimen and a stop watch was started. Initially a large fraction of the smoke passed through the specimen but the particles removed from the air stream and deposited in the specimen improved the effectiveness of the filtering action by "plugging up" the sheet. Hence, the meter reading, called the penetration and expressed as a percentage of the full scale reading, decreased and the pressure drop across the specimen, called the resistance, increased as the flow continued. Readings of resistance and penetration were taken at intervals until the resistance rose beyond the range of the manometer M—i.e., about 55 mm. of water.

The initial resistance was taken as the pressure drop across the specimen when clean air was passing

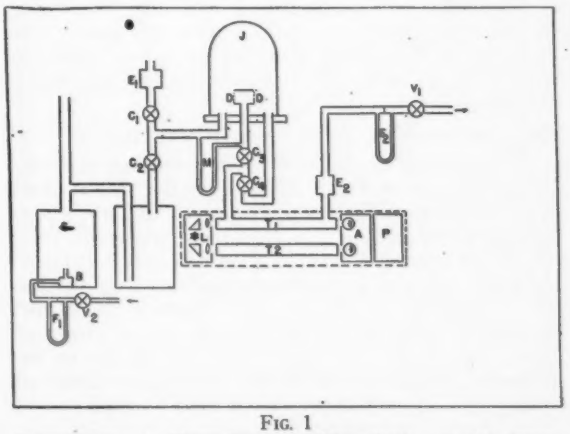

FIG. 1

Penetrometer. A—Photocell and amplifier cabinet. B—Gas burner. C_1, C_2, C_3 and C_4—Stopcocks. D—Specimens. E_1 and E_2—Electrostatic precipitator. F_1 and F_2—Flow-meters. J—Bell jar. L—Lamp, reflecting prisms, and collimating lenses. M—Manometer. P—Power supply for amplifier. S—Smoke chamber. T_1—Active absorption tube. T_2—Blank absorption tube. V_1 and V_2—Valves.

through the system. The speciman D consisted of two circular disks cut from the paper with a die of 4-inch diameter. The unfiltered smoke concentration was maintained at approximately 23 mg. per cubic meter and was measured from time to time by means of the electrostatic precipitator E_2. The meter reading was not a linear function of the smoke concentration in the absorption tube T_1 but it was arbitrarily called penetration.

Although complete data for curves relating resistance and penetration were obtained, it was decided to compare the filtering efficiencies of the specimens by comparing resistances at 1.0 and 10% penetrations. For the purpose of the following presentation, the lower the resistances at the indicated penetration, the greater is the efficiency of the specimen as a filter.

Preparation of Handsheets

Handsheets were formed on the British sheet mold according to TAPPI Standard T 205 m-36. The polished plate which is ordinarily placed on the sheets during drying was not used. Sheets were air dried and conditioned for 24 hours prior to test at 73° F. and 50% relative humidity.

Prefaration of Alcohol-Replaced Sheets

Alcohol-replaced sheets were formed in the same manner as the regular sheets, with the following exception: Before couching the wet sheet off the forming wire, a piece of fourdrinier wire was carefully laid over the sheet and about 250 ml. of denatured ethyl alcohol gently poured over the entire sheet surface. The fourdrinier wire was then removed and, after 1 minute, the excess alcohol was drained off. This method was found to duplicate the results obtained by forming the sheets in alcohol and possesses obvious advantages over the latter method.

Preparation of Air-Formed Pads

Air-formed pads were prepared by blowing dry disintegrated pulp (the Gösta Hall disintegrator was used) onto a fourdrinier wire held in the lower section of a special test cell which could be connected to the penetrometer in place of the usual specimen at D in Fig. 1. After deposition of the fibers as a loose pad in this lower part of the cell, the upper section which telescoped with the lower section was pressed down and bolted into place. The test specimen occupied a constant and reproducible volume.

Preparation of Sheets Containing Filler

Filled sheets were prepared with the Noble and Wood sheetmaking apparatus. This equipment was operated with a closed white water system, allowing a build up of filler in the white water and improving retention.

Measurement of Fiber Length and Width

These measurements were made according to methods developed by Graff *(14)*. Briefly, this method was as follows. The fibers were dyed and slides containing about 25 fibers per slide were prepared. After the specimens were dried, a drop of calcium chloride solution was added to soften the fibers. By the use of a dissecting microscope, the fibers were aligned parallel to each other and covered with a cover of glass. Actual measurements were carried out on the projected images of the fibers. About two hundred fibers were measured for each material tested.

Experimental Results

Effect of Processing on Filtering Efficiency

The aim in this part of the study was to vary the sheet density through the greatest possible range, maintaining a constant basis weight, and to observe the relationship to filtering efficiency. An unbleached spruce alpha pulp was chosen and the variations in sheet density were achieved by one or by combinations of several of the following methods: change of the conditions of wet pressing, variation of the degree of beating, addition to conventionally beaten pulp of varying proportions of pulp which had been dry disintegrated in the Gösta Hall disintegrator, and replacement of the water by alcohol before couching the sheet from the forming wire. The sheet weight was 120 grams per square meter.

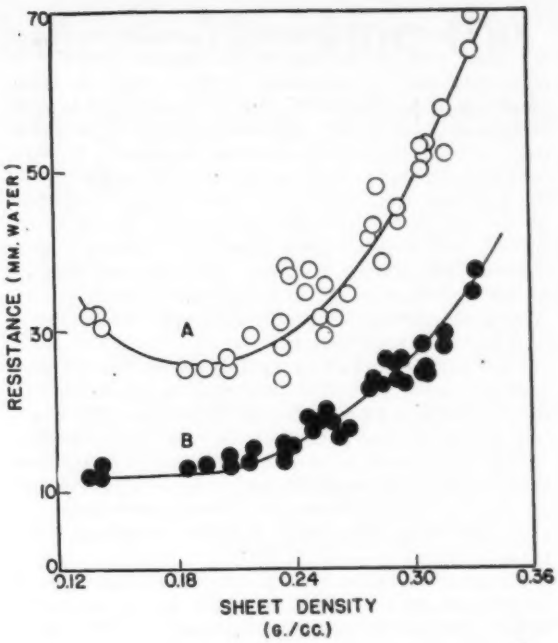

FIG. 2

Effect of Sheet Density on Resistance. Alpha Pulp—Sheet Weight, 120 g./sq. m. A—1% Penetration. B—10% Penetration.

The pulp was lightly beaten in a laboratory beater for 10 minutes with 4500 grams on the bedplate. A freeness of about 850 ml. Schopper-Riegler was obtained. The filtering efficiencies of conventionally formed sheets, whose density was changed only by variations in the conditions of wet pressing, are presented in Table I. Sheets of lower density were obtained by alcohol replacement of the water in the sheet before couching and the data for such sheets, subjected to various pressures in the pressing operation, are presented in Table II.

Sheet densities falling in the range of those obtained by changing the pressing conditions for conventionally formed sheets were obtained by adding various proportions of dry disintegrated pulp to the lightly beaten pulp described above and pressing at 40 p. s. i. The data for such sheets are shown in Table III.

The relationship of sheet density to filtering efficiency when density variations were obtained by changing the degree of beating is shown in Table IV. The sheets were conventionally formed and pressed at 40 p. s. i. The effect of the lower densities obtained by alcohol replacement and pressing at the same pressure is illustrated in Table V.

When the resistance at 1.0 and 10% penetration are plotted against sheet density for the various methods of processing, the curves shown in Fig. 2 are

TABLE I.—ALPHA PULP—WATER-FORMED SHEETS

Density Changed by Wet Pressing—Sheet Weight 120 g./sq. m.

Press Pressure, lb./sq. in.	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 1.0% Penetration, mm. water
10	0.248	5.5	19.0	34.8
20	0.257	6.0	20.8	35.7
30	0.287	7.5	23.5	38.5
40	0.280	7.0	22.6	41.5
40	0.282	7.5	23.6	43.3
40	0.294	7.5	23.9	45.1
40	0.295	7.5	26.2	43.8
40	0.291	7.5	25.4	43.2
40	0.294	6.5	23.4	47.4
50	0.307	8.0	24.3	50.0
60	0.308	8.5	23.2	52.0
70	0.309	8.5	23.9	53.6
40 *	0.319	9.5	29.5	52.0

* Pressed twice.

TABLE II.—ALPHA PULP—ALCOHOL-REPLACED SHEETS

Density Changed by Wet Pressing—Sheet Weight 120 g./sq. m.

Press Pressure, lb./sq. in.	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 1.0% Penetration, mm. water
0	0.137	2.8	11.7	32.0
0	0.142	2.5	11.5	32.2
0	0.144	2.8	13.1	30.5
20	0.196	3.5	12.9	25.0
30	0.207	3.8	13.3	26.5
40	0.220	4.5	15.1	29.5
40	0.208	4.0	12.8	25.1
60	0.217	4.5	12.7	...
80	0.235	5.5	14.7	27.8
100	0.235	5.3	13.5	23.7

TABLE III.—ALPHA PULP—WATER-FORMED SHEETS

Density Changed by Dry Disintegration—Sheet Weight 120 g./sq. m.

Disintegrated Pulp Used, %	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 1.0% Penetration, mm. water
0	0.308	7.8	21.0	45.0
25	0.292	6.5	19.2	38.2
50	0.286	6.3	18.7	36.1
75	0.273	6.3	16.8	34.0
100	0.270	5.8	16.7	33.2

TABLE IV.—ALPHA PULP—WATER-FORMED SHEETS

Density Changed by Beating—Sheet Weight 120 g./sq. m.

Beating Time, min.	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 1.0% Penetration, mm. water
0	0.255	6.3	18.5	31.5
0	0.258	6.0	18.4	29.5
10	0.280	7.0	22.6	41.5
10	0.282	7.5	23.6	43.3
10	0.294	7.5	23.9	45.1
10	0.295	7.5	26.2	43.8
10	0.291	7.5	25.4	43.2
10	0.294	6.5	23.4	47.4
20	0.318	8.5	28.1	57.8
20	0.307	8.5	28.1	53.0
30	0.333	11.5	34.5	65.0
30	0.334	12.0	37.5	69.6

TABLE V.—ALPHA PULP—ALCOHOL-REPLACED SHEETS

Density Changed by Beating and Pressing—Sheet Weight 120 g./sq. m.

Beating Time, min.	Press Pressure, lb./sq. in.	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 1.0% Penetration, mm. water
10	40	0.208	4.0	12.8	25.1
10	40	0.220	4.5	15.1	29.5
20	40	0.235	4.0	15.9	31.3
20	60	0.239	4.5	15.7	36.7
30	40	0.238	5.0	15.7	38.0
30	60	0.250	5.3	17.2	37.5
60	40	0.285	7.0	26.1	48.0

TABLE VI.—EFFECT OF BASIS WEIGHT ON FILTERING EFFICIENCY

Alpha Pulp—Sheet Density 0.290 g./cc.

Sheet Weight, g./sq. m.	Sheet Caliper, 0.001 in.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 3.5% Penetration,* mm. water
70	10.5	3.5	26.0	45.0
124	17.0	7.5	23.5	35.3
180	24.2	11.5	25.0	36.9
228	32.0	16.0	32.1	52.6

* These data were correlated at 3.5% penetration, because a penetration of 1.0% was not obtained on the sheets weighing 70 and 228 grams per square meter.

obtained. A correlation is seen to exist between the resistances at 1.0 and 10% penetration and sheet density. Moreover, the curves for the two different penetrations are roughly parallel.

The curve relating density and resistance at 1.0% penetration shows a definite minimum corresponding to an optimum sheet density at which maximum filtering efficiency is obtained. The curve relating density and resistance at 10.0% penetration does not show a minimum, but merely flattens out at the lower sheet densities. It should be remembered that only one pulp was used and that the sheet weight was held constant at 120 grams per square meter throughout this series of experiments.

Effect of Basis Weight on Filtering Efficiency

Table VI shows the effect on filtering efficiency of varying basis weight while holding sheet density constant. The lightly beaten alpha pulp previously described was used. These data show the presence of a very definite minimum, indicating the presence of an optimum sheet weight at which maximum filtering efficiency is obtained.

The presence of such an optimum is to be expected. In a very thin sheet, the paths through the sheet are relatively short, thus making particle removal difficult. On the other hand, in a very thick sheet the particles may be removed after traveling only a fraction of the distance through the sheet. This is inefficient, since there is a portion of the sheet which contributes little or nothing to the filtering action but does contribute materially to the resistance to the flow of air. Therefore, is to be expected that, somewhere between these two extremes, an optimum sheet thickness would occur.

It should also be noted that linear relation exists between sheet thickness and the initial resistance, at constant sheet density. Because these sheets are of the same density and, therefore, have the same ratio of fibers to voids, such a relation is to be expected

Effect of Sheet Density at Constant Sheet Weight

The effect of sheet density at constant sheeet weight was determined for several sheet weights above and below the optimum weight indicated by these results. Sheet weights of 85, 120, 150, and 205 grams per square meter were used.

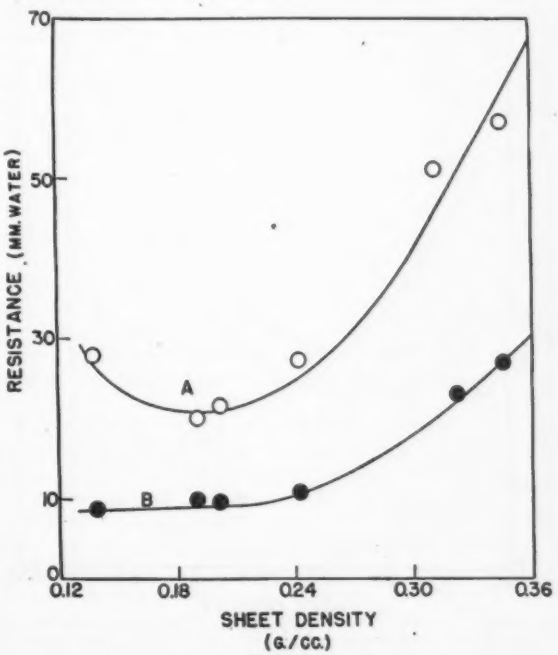

FIG. 3

Effect of Sheet Density on Resistance. New Zealand Flax Pulp—Sheet Weight, 120 g./ sq. m. A—1% Penetration. B—10% Penetration.

The filtering efficiency of the 120 and of the 150 grams per square meter sheets were found to be about the same, showing that sheet weight has little effect over this range. The 85 and 205 grams per square meter sheets showed a lower filtering efficiency, as would be expected from the previous experiment.

Effect of Sheet Density on the Filtering Efficiency of Pulps Other Than Alpha

Th effect of sheet density on the filtering efficiency of New Zealand flax *(Phormium tenax)* soda pulp was determined. The sheet weight was held constant at 120 grams per square meter so that the results would be directly comparable with those obtained for the same weight of alpha pulp. These results are presented in Table VII and Fig. 3.

Similar experiments were carried out using spruce pulp prepared by the sulphite process. This pulp formed sheets of high density, as does any pulp which is readily "hydrated." In order to reduce the density as much as possible, the pulp was dry disintegrated and given minimum mechanical treatment during its suspension in water. When this sheet density was lowered by dry disintegration and alcohol replacement, the resultant sheets were of such low physical strength that they could not be tested. Therefore, only a limited range of relatively high density sheets could be tested. The results are shown in Table VIII.

In order to compare the effects of sheet destiny on the various pulps, the data of Fig. 2, showing the effect on alpha pulp, and Fig. 3, showing the effect on New Zealand flax, are combined with the data for the sulphite pulp and shown in Fig. 4. These curves are for 1.0% penetration, but a similar relation exists for 10.0% penetration.

Examination of Fig. 4 shows that the curves for the various pulps are similar and are approximately parallel; alpha and New Zealand flax reach an optimum filtering efficiency at about the same density. It is apparent that the optimum density for sulphite pulp was not attained. The curves also rank the pulps in order of their filtering efficiency, when compared at equal density. This will be discussed in greater detail in the section covering the comparison of pulps.

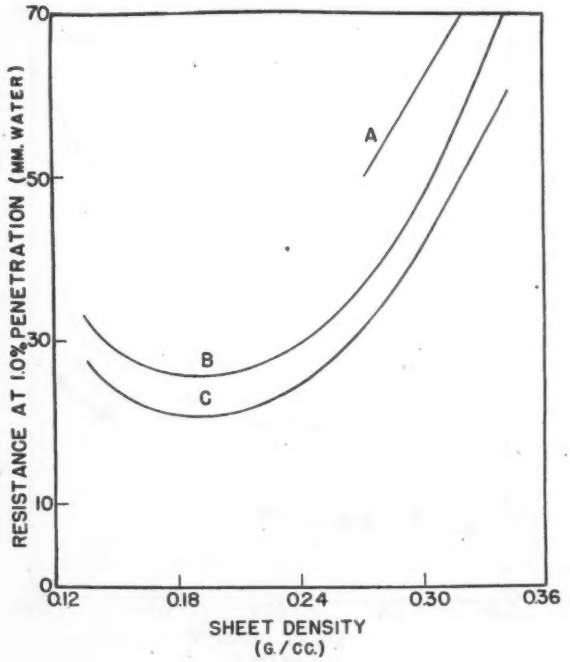

Fig. 4

Effect of Sheet Density on Resistance. 1% Penetration—Sheet Weight, 120 g./sq. m. A—Sulphite Pulp. B—Alpha Pulp. C—New Zealand Flax Pulp.

TABLE VII.—NEW ZEALAND FLAX SODA PULP

Sheet Weight 120 g./sq. m.

Treatment	Wet Pressing Pressure, lb./sq. in.	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 1.0% Penetration, mm. water
Water sheet	40	0.346	8.5	18.9	57.0
Dry disintegrated, water sheet	40	0.323	10.5	20.5	51.0
Dry disintegrated, alcohol-replaced	40	0.243	5.8	13.5	20.7
Dry disintegrated, alcohol-replaced	20	0.202	4.5	9.5	21.3
Dry disintegrated, alcohol-replaced	10	0.191	4.0	9.7	20.0
Dry disintegrated, alcohol-replaced	0	0.139	3.5	8.8	27.5

TABLE VIII.—SPRUCE SULPHITE PULP—WATER-FORMED SHEETS

Sheet Weight 120 g./sq. m.

Treatment	Pressing Pressure, lb./sq. in.	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance at 10.0% Penetration, mm. water	Resistance at 1.0% Penetration, mm. water
Dry-disintegrated	10	0.268	7.5	31.6	52.0
Dry-disintegrated	15	0.296	9.0	34.8	59.7
Dry-disintegrated	20	0.320	10.5	42.6	68.0

TABLE IX.—ALPHA PULP—DRY-DISINTEGRATED, AIR-FORMED PADS

Rate of Flow—0.731 liter/min./sq. cm.

Pad Weight, g.	Pad Density, g./cc.	Initial Resistance, mm. water	Resistance at 1.0% Penetration, mm. water
3.0	0.059	18.0	57.5
4.7	0.092	28.0	51.5
4.7	0.082	27.0	51.1
4.9	0.096	29.0	49.7
5.1	0.100	30.0	49.2
5.3	0.104	30.5	50.1
5.4	0.106	31.5	48.5
5.5	0.108	31.0	48.5
6.4	0.126	38.0	50.0
7.2	0.141	46.0	59.5
8.0	0.157	62.5	65.3

TABLE X.—ALPHA PULP—DRY-DISINTEGRATED, AIR-FORMED PADS

Rate of Flow 0.514 liter/min./sq. cm.

Pad Weight, g.	Pad Density, g./cc.	Initial Resistance, mm. water	Resistance at 1.0% Penetration, mm. water
3.2	0.063	11.0	43.0
3.6	0.071	12.0	31.7
4.7	0.092	18.5	29.9
5.4	0.106	22.0	30.2
6.3	0.124	28.5	41.0
6.7	0.132	38.5	43.0
6.8	0.134	38.5	43.1

TABLE XI.—EFFECT OF FILLERS ON AIR PERMEABILITY OF ALPHA PULP

Filler in Sheet, %	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance Factor at Penetration of 10.0%	Resistance Factor at Penetration of 1.0%
		Titanium Dioxide		
0.0	0.242	6.0	1.00	1.00
4.8	0.243	6.5	1.07	1.00
8.8	0.244	6.5	1.15	1.07
18.9	0.244	9.0	1.36	1.21
		Calcium Carbonate		
0.0	0.240	5.8	1.00	1.00
5.0	0.241	6.0	1.11	1.13
6.8	0.241	6.5	1.13	1.15
15.2	0.243	7.0	1.22	1.21
		Diatomaceous Earth		
0.0	0.284	7.5	1.00	1.00
6.8	0.264	7.5	0.97	0.89
9.6	0.266	9.5	1.00	0.95
26.7	0.266	31.0	1.72	1.09
		Asbestos		
0.0	0.272	6.5	1.00	1.00
2.4	0.272	6.5	0.89	0.88
5.0	0.274	7.5	0.88	0.78
10.9	0.274	10.7	0.94	0.85

Other Correlations

The data on the effect of sheet density indicates the existence of correlations between initial resistance and sheet density at constant sheet weights. If one

considers a change of density as simply a change in the ratio of fiber volume to total sheet volume, with a resultant change in the size of the passages through the sheet, such a correlation is not surprising. As would be expected, the initial resistance increases with increase in sheet density and with increase in sheet weight.

Effect of Sheet Density in Air-Formed Pads

The effect of sheet density on the filtering efficiency of air-formed pads of alpha pulp was also studied. In this case, the volume occupied by the test specimen was held constant and the density varied by changing the pad weight—i. e., the amount of fiber packed into the test cell. Because different rates of air flow (0.283 liters/ min./sq. cm. for regular sheets and no less than 0.514 liter/min./sq. cm. for air-formed pads), as well as different sheet weights and densities, were used, these data are not directly comparable with those obtained for the regular sheets.

The results of these experiments are given in Tables IX and X and are presented in graphical form in Fig. 5. The observed correlations are similar to those obtained for the test sheets formed in a more orthodox manner. The presence of an optimum density is clearly indicated for both rates of flow.

It is suggested that the testing of air-formed pads prepared in this manner offers a convenient method for comparison of the intrinsic effectiveness of different pulps. Comparisons can thus be made at equal weights and equal densities.

The preceding experiments have shown that filtering efficiency is related to sheet density, regardless of whether the density was altered by change in sheet caliper while holding the sheet weight constant (as in the case of the water and alcohol sheets) or by change in sheet weight while holding the caliper constant (as in the case of air-formed sheets). Moreover, an optimum sheet density is observed in both cases. To explain the occurence of this optimum, one must take into account the mechanism of the filtration of the particles.

Three sheet characteristics are probably most important in the removal of particles: (1) size of the capillary passages, (2) length of the passages, and (3) nature of the passages—i. e., the number of times they change direction and size.

In this work, filtering efficiencies have been evaluated by comparing the pressure drops across the test sheets at a definite degree of particle removal from the air stream. All the sheets require a period of impregnation before reaching this degree of removal. During this time, particles are collecting on the walls of the passages through the sheet and decreasing the size of these passages, as evidenced by the increasing pressure drop through the filter. A decrease in the size of the passages doubtless facilitates particle removal but, at the same time, it increases the resistance to the flow of air. Because filtering efficiency is a composite of these two effects, one would expect an optimum passage size.

The length of the passages in the sheet may vary from the caliper of the sheet to many times this value. In sheets of high density, this average path is long (compared with the sheet thickness) and tortuous in nature. In sheets of very low density, the length of these passages approaches the thickness of the sheet as the probability of direct passages through the sheet increases.

From a consideration of the effects of all these factors acting simultaneously, it seems logical to expect the existence of an optimum density at which these factors are related in such a manner as to give maximum filtering efficiency.

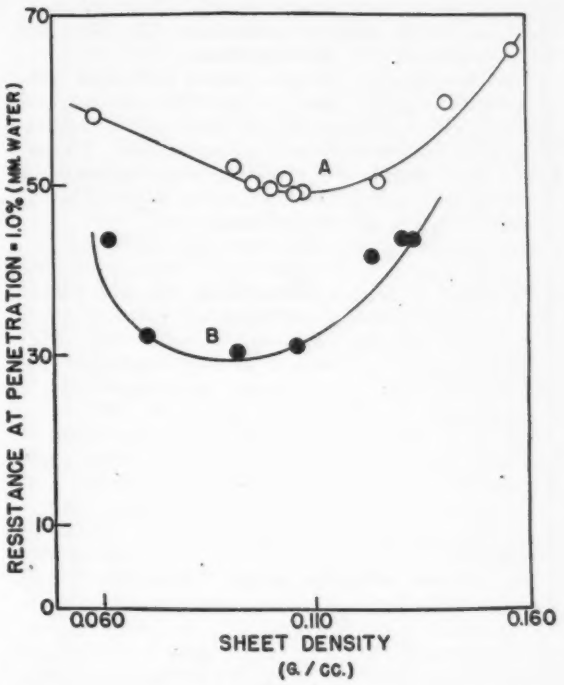

Fig. 5

Effect of Density on Resistance. Air-Formed Pads of Alpha Pulp—1% Penetration. A—0.731 l./min./sq. cm. flow. B—0.514 l./min./sq. cm. flow.

After testing, some of the sheets were torn in half and the depth to which the particles had penetrated was noted. With sheets of low density, the carbon particles had penetrated the entire thickness of the sheet; with sheets of high density, the black layer denoting the depth of penetration of the particles extended only a short distance into the sheet. This will explain the fact that an effect of sheet density is more pronounced for high sheet weights than for low. In sheets of high weight and high density, only a portion of the sheet contributes to the filtering action, whereas the entire sheet offers resistance to the flow of air.

Effect of Fillers on Filtering Efficiency

The work of Lane *(9)* on sulphite pulp showed that the addition of fillers increased the air permeability of the resulting paper. Using alpha pulp, experiments were made to determine the effect of the addition of fillers upon filtering efficiency. Sheet weight was held constant at 97 grams per square meter. This allows the comparison of the efficiency of a given weight of pulp with that of the same weight of a combination of pulp and filler.

The Noble and Wood sheetmaking apparatus was used in this series of experiments, because it is provided with a closed white water system and permits the concentration of the filler in the white water to be built up so that good retention of filler in the sheets may be obtained. The lighly beaten alpha pulp, previously referred to, was used.

Results of experiments with titanium dioxide, calcium carbonate, diatomaceous earth, and asbestos are tabulated in Table XI. A new term, *resistance factor,* is used in this and following tables, as well as in the subsequent discussion. This resistance factor is the ratio of the resistance of the particular sheet to the

resistance of the unfilled blank sheet. All results are the averages of two determinations.

The titanium dioxide and calcium carbonate were samples of regular papermaking chemicals used as fillers. Celite is a diatomaceous earth sold as a filtering aid by the Johns-Manville Corporation. The asbestos was a sample of Canadian asbestos defibered by digestion with 6 *N* hydrochloric acid, followed by digestion with 5% sodium hydroxide.

The data of Table XI show that the resistance factor increases on the addition of titanium dioxide and calcium carbonate fillers; thus, the addition of these fillers reduces the filtering efficiency of these sheets. The addition of small amounts (about 5%) of diatomaceous earth and asbestos increased the filtering efficiency of the sheets, as evidenced by a minimum value for the resistance factor.

Figure 6 shows in graphical form the relations between the resistance factor at 1.0% penetration and the amount of filler in the sheets of alpha pulp.

It is evident that the inital resistance of the various sheets are not decreased by the addition of filler. This shows that the air permeability of these low-density sheets was not increased as was that of the normal density sheets studied by Lane and others.

A series of experiments were made using sulphite pulp and titanium dioxide, the results of which are tabulated in Table XII. It should be noted that the area of the test specimen was twice that normally employed. This was necessary because the high sheet density resulted in very low sheet porosity. The values show that the addition of a small amount of filler increases the air permeability of the sheets, as evidenced by a decrease in the initial resistance, whereas the addition of a large amount of filler decreases the air permeability. The resistance factor also follows the same trend, passing through a minimum.

Lane *(9)* attributed the increase in air permeability on the addition of filler to a decrease in the bonded area of the fibers. The addition of very large amounts of filler, however, literally plugs the sheet and reduces the air permeability. This explanation holds well for the effects observed on sulphite pulp.

To explain the effect observed on sheets of alpha pulp, it must be assumed that the bonded area of the fibers is so low in low-density sheets that it is not appreciably changed by the addition of small amounts of filler. Hence, there is little or no effect on the air permeability of the sheet; the only effect observed is that of plugging at higher concentrations of filler.

No such simple explanation is available for the effect of the various fillers on the filtering efficiencies of the sheets. The effect cannot be attributed to change in sheet density, because this remained essentially constant during any one series of experiments. The only statement which can be made is that certain fillers (such as asbestos and diatomaceous earth) improve the filtering efficiency of alpha pulp. This may result from the alteration of the pore size and/or pore size distribution of the sheet. The maximum improvement is obtained at conceneration of filler below 10%, based on the weight of the sheet.

Effect of Fiber Length

Fibrous raw materials of the type commonly encountered in papermaking differ from one another principally in fiber diameter and/ or fiber length.

To determine the effect of fiber length on filtering efficiency, alpha pulp was classified on a Bauer-McNett classifier. The fraction retained on the 20-mesh screen was cut up with a very sharp knife and reclassified. In this manner, four fractions were obtained of approximately equal fiber diameters but varying in length from approximately 0.5 to 2.5 mm. These fractions were made into sheets and tested, the results of which are given in Table XIII.

The data show that the resistance at a penetration of 1.0% remained essentially constant for all four fractions. However, it will be noted that the density of the sheets varied by approximately 10% and increased with decreasing fiber length.

A qualitative estimation of the effect of this change in sheet density may be made by comparing the effect of a corresponding change in density on the same weight of unclassified alpha pulp (Fig. 2). Because the fiber diameters and, certainly, the fiber lengths of the classified and unclassified pulps are not the same, a quantitative comparison of the effect of density on the two pulps is not justified. However, since an increase in density over this range causes an increase in the resistance at 1.0% penetration for the unclassified pulp, whereas the same increase in density caused no change for the cut, classified pulp, it is logical to conclude that this decrease in fiber length caused a slight increase in filtering efficiency.

TABLE XII.—TITANIUM DIOXIDE—SULPHITE PULP

Sample Area—Twice Normal Area

Filler in Sheet, %	Sheet Density, g./cc.	Initial Resistance, mm. water	Resistance Factor at Penetration of 10.0%
0.0	0.562	25.0	1.00
7.2	0.562	19.5	0.80
9.5	0.564	19.5	0.81
17.0	0.564	24.0	1.10

TABLE XIII.—CUT AND CLASSIFIED ALPHA PULP

Sheet Weight 120 g./sq. m.

Approximate Fiber Length, mm.	Sheet Density, g./cc.	Resistance at Penetration of 1.0%, mm. water
2.5	0.270	38.8
1.5	0.277	37.0
0.8	0.288	39.0
0.5	0.304	37.0

TABLE XIV.—COMPARISON OF PULPS

Pulp	Resistance Factor	Arithmetic Average Fiber Width, mm.	Weighted Average Fiber Width, mm.	Arithmetic Average Fiber Length, mm.	Weighted Average Fiber Length, mm.	Average Fiber Area, sq. mm.
Pine, kraft	1.30	0.034	0.036	1.17	1.74	0.0413
Spruce, kraft	1.27	0.026	0.029	0.81	1.17	0.0231
Spruce, sulphite	1.25	0.030	0.043	0.60	2.05	0.0230
Cotton linters	1.00	0.027	0.028	1.25	1.61	0.034
Spruce, alpha	1.00	0.024	0.025	0.75	1.16	0.0185
New Zealand flax, soda	0.92	0.013	0.013	1.20	1.63	0.0158

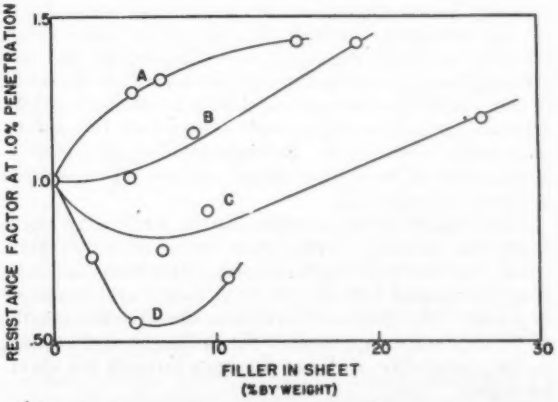

Fig. 6

Effect of Fillers on Resistance Factor A—Titanium Dioxide. B—Calcium Carbonate. C—Diatomaceous Earth. D—Asbestos.

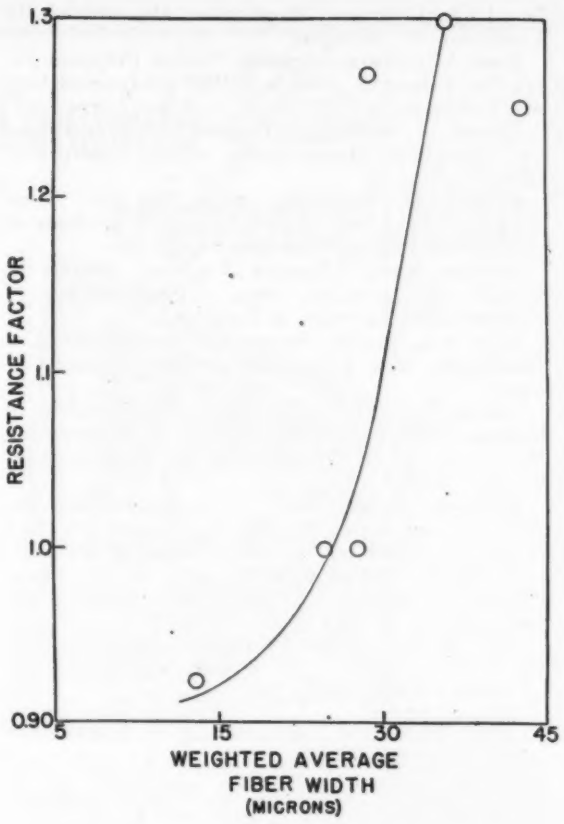

FIG. 7
Effect of Fiber Diameter on Resistance Factor.

COMPARISON OF PULPS

When this work was begun, a number of commercially available pulps were made into test sheets, using equal weights of material and identical sheetmaking techniques. When these sheets were tested, pulps which formed sheets of low density were found to be more efficient filters than those which formed sheets of higher density. Such a comparison may give a measure of the immediate practical filtering efficiency of the pulps, but it does not give a true comparison of the inherent filtering ability. The work on sheet density and sheet weight has shown that materials should be compared on the basis of equal weights at equal densities.

The apparatus for the preparation and testing of air-formed pads allows such a comparison, without the complicating effects of variables introduced by forming sheets in water. Using air-formed pads, the filtering efficiencies of six fibrous materials were determined. Measurements of fiber length and diameter were made on all materials. These data, together with filtering efficiencies, are tabulated in Table XIV. The "resistance factor" is calculated by dividing the resistance at a penetration of 1.0% for a given material by the resistance at the same penetration for an equal weight of alpha pulp. Because the volume occupied by the test sheets is held constant, equal weights of material from sheets of equal density, thus permitting a comparison of the various materials on a logical basis.

Disregarding for the moment any possible effects of individual fiber characteristics other than length and width, Table XIV indicates that there is no correlation between average fiber length (either weighted or arithmetic average) and the resistance factor. Neither is there a correlation between average fiber area and the resistance factor. There is, however, a correlation between average fiber width (either weighted or arithmetic average) and the resistance factor. This correlation between weighted fiber width and the resistance factor is shown in Fig. 7. These results are in agreement with the work of Kaufmann *(6)*, who reported that a decrease in the diameter of the fibrous material caused an increase in the filtering efficiency.

Thus, from a practical point of view, a fibrous material should have a small diameter to give a high filtering efficiency; it should have a low bonding strength, so that sheets of low density may be formed by normal papermaking processes, for which the optimum sheet density seems to be about 0.20 g./cc.

To obtain fibers with very small diameters, it would be necessary to use materials other than those commonly employed in papermaking. For example, pineapple fibers are about 8 microns in diameter and those of sea grass are slightly smaller *(13)*. Pulp made from these materials would undoubtedly be expensive, but since relatively small amounts are required, the added expense might be justified.

To obtain the low sheet density necessary for maximum filtering efficiency, several devices might be employed in commercial practice. For commercial production, the filter sheets should be formed in the usual manner on conventional papermaking equipment. Further, pulps which are difficult to "hydrate" are required, such as those obtained by the alkaline treatment used in the manufacture of alpha pulp. Experiments dealing with the chemical processing of pulps should be very fruitful.

It is a well-known fact *(15)* that the bonding strength of cellulose fibers is reduced when their free hydroxyl groups are partially replaced by other groups, such as acetyl groups. A partially acetylated pulp might be very helpful in obtaining optimum sheet density. The sheet density also might be reduced by passing the west sheet through an alcoholic bath after it had left the wet presses. Such an operation would require the design and construction of special equipment which would permit the use of a volatile liquid such as alcohol.

Summary and Conclusions

A study was made of the choice and processing of fibrous materials for use as air filters.

From the studies of the effect of change of sheet density at constant sheet weight, the following conclusions may be drawn:

1. With sheets of constant weight, filtering efficiency is dependent upon sheet density. Moreover, there is an optimum density at which maximum filtering efficiency is obtained.

2. This relationship between filtering efficiency and sheet density holds whether the density is changed by means of: (a) wet pressing, (b) beating, (c) dry disintegration, or (d) use of a dispersing medium other than water.

3. The correlation between sheet density and filtering efficiency at constant sheet weight is not the same for all sheet weights.

4. The same type of correlation between sheet density and filtering efficiency at constant sheet weight is obtained for several types of fibers.

From the study of the effect of change of sheet density at constant sheet caliper, the following conclusions may be drawn:

1. With sheet of constant caliper and varying density secured by varying the sheet weight, filtering efficiency is a function of sheet density.

2. There is an optimum sheet density at which maximum filtering efficiency is obtained.

When the sheet density is held constant and the sheet weight is varied, there is a correlation between sheet weight and filtering efficiency; there is an optimum sheet weight at which maximum filtering efficiency is obtained.

There is, therefore, an optimum sheet weight and an optimum sheet density for the maximum filtering efficiency for each pulp.

A logical basis for the comparison of filtering efficiencies of different materials is the use of equal weights of materials at the same sheet density, rather than the use of sheets of equal weight formed under identical conditions.

A study of the effect of fillers on filtering efficiency indicates that certain fillers (namely, asbestos and diatomaceous earth) produce an increase in filtering efficiency when added to the sheet in low concentrations.

An apparatus was designed and built which permits the formation of sheets in air, and allows the filtering efficiencies of these sheets to be tested. Using this apparatus, the filtering efficiencies of six fibrous materials were compared. Measurements of fiber length and diameter were made on all materials. From this study, the following conclusions may be drawn:

1. Fiber length has little effect upon filtering efficiency.

2. Fiber diameter is an important factor in determining filtering efficiency. Filtering efficiency increases with decrease in fiber diameter.

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New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Lawrence M. Burns, Pulp Mill Chemist, Brown Company, Berlin, New Hampshire, a 1933 graduate of Colby College.

Henry C. Press, Research Dept., Oxford Paper Co., Rumford, Maine, a 1921 graduate of Darmstadt College.

Kenneth H. Fleming, Assistant Chief Engineer, Hammermill Paper Co., Erie, Pennsylvania. He attended the University of Pennsylvania.

John T. Flis, Production Engineer, Barrett Div., Allied Chemical & Dye Corp., Elizabeth, New Jersey, a 1941 graduate of Newark College of Engineering.

David J. Flood, Chief Engineer, Pacific Paperboard Co., Longview, Washington. He attended the University of Michigan.

Jesse A. Jackson, Engineer, Florida Pulp and Paper Co., Pensacola, Florida, a 1928 graduate of Cornell University.

Harold J. Kenneway, Chemist, McLaurin-Jones Co., Brookfield, Massachuestts, a 1939 graduate of Clark University.

Ricahrd H. Malamphy, Sales Engineer, Mead Sales Co., Inc., New York City, a 1935 graduate of George Washington University.

Stewart Rowe, Chemical Engineer, Procter & Gamble Co., Ivorydale, Ohio, a 1943 graduate of Massachusetts Institute of Technology.

Warren L. Rossin, Owner, Wilross Products Co., Hawthorne, New Jersey. He attended Wagner College.

Gunnar K. Tallgren, Assistant Superintendent of Sulphite Mill, Rhinelander Paper Co., Rhinelander, Wisconsin, a 1927 graduate of the Technical University, Finland.

Beaumont Thomas, Chief Chemist, Stebbins Engineering and Manufacturing Co., Watertown, New York, a 1933 graduate of West Virginia University.

George H. Thompkins, Plant Manager, The Black-Clawson Co., Hamilton, Ohio, a 1927 graduate of the University of South Dakota.

John W. Wing, Mill Manager, Gaspesia Sulphite Co., Ltd., Chandler, P. Q., Canada, a 1936 graduate of Queen's College.

Low Pressure Laminating of Plastics

The Reinhold Publishing Company has just issued "Low Pressure Laminating of Plastics" by J. S. Hicks and R. J. Francis of the Owens-Illinois Fiberglas Corporation. (162 pp. 6 x 9) (100 illustrations).

Although there have been published a number of good books relating to plastics this is one of the first devoted to a rudimentary discussion dealing with low pressure and contact pressure laminating of plastics.

This work outlines the several steps necessary to fabricate a laminate and lists sources of raw materials, by companies and trade names.

Among the subjects covered are: the general field of plastics; design and use of molds; resins, catalysts and curing; reinforcements for plastics; joining and machinery of plastics; engineering and cost experiments. An appendix giving an outline of laboratory experiments and a patent index are included.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y., at $4.50 per copy.

Handbook of Textiles

D. Van Nostrand recently issued an American edition of The Standard Handbook of Textiles" by A. J. Hall, consulting chemist, London. (295 pp. 5½ x 8½).

Although this book is written primarily for practical operators in the textile industry there is much of interest to papermakers. A review is given of the various textile fibers, their properties, and means of their conversion into yarns and fabrics. Chapters are also devoted to bleaching, dyeing and finishing. A few simple identification tests for some of the fibers are given.

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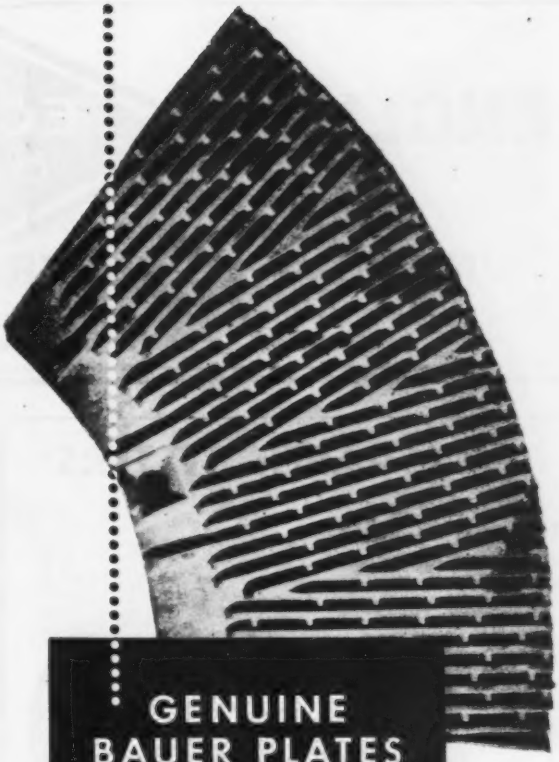

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TRADE MARK

UNIFORM SUPERIOR DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

T.M.I. PAPER TESTERS

BASIS WEIGHT SCALES
HINDE & DAUCH CRUSH
NEWS PENETRATION
TEAR—BURST—STIFFNESS

DEAD WEIGHT MICROMETER
1/10,000" x 1/1000" models

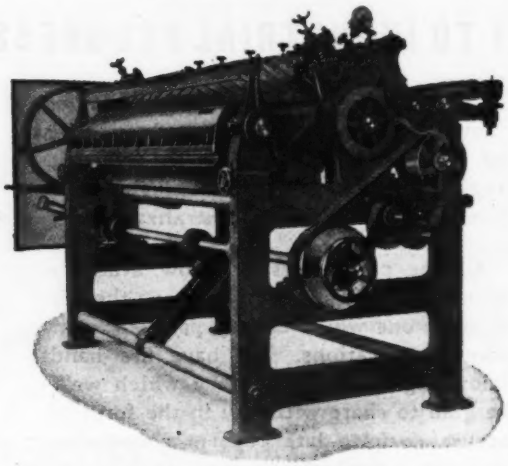
SCHOPPER TYPE
TENSILE
FREENESS
FOLDING
CANADIAN STANDARD FREENESS

METRIC
SCALES
MICROMETERS
TENSILE TESTERS

TESTING MACHINES, Inc.
429 W. 42nd St., New York 18, N. Y.
Old inaccurate Scales, Micrometers and other testers recalibrated and made over like new.

MODEL 28

ROLLER BEARING CUTTER



HAMBLET MACHINE CO.
LAWRENCE, MASS.
MAKERS OF
SINGLE, DUPLEX AND DIAGONAL PAPER CUTTERS
CUTTER KNIVES, PATENT TOP SLITTERS

TENAX
"TENAX FELTS ARE TOUGH"

The better the felts, the better the paper

For over half a century Tenax Felts have been helping paper makers improve the quality of their product, get more production at a lower cost.

Serving the paper industry since 1891

LOCKPORT FELT COMPANY · NEWFANE, NEW YORK

Youngsters in the Corn Belt begin early to know corn quality and production.

START OF A BUSINESS CYCLE

This small boy, playing at shelling corn in his toy wagon, symbolizes an economic fact.

In a few years, he will sell part of his crop for cash to Corn Products Refining Company. Some of his corn will be converted into materials that help make better paper.

In the form of wrapping paper, bags, and dozens of other varieties, that paper, containing these products from corn, will go back to the farm.

Thus the business cycle is completed, with profit to all.

In using products from corn, paper makers not only help improve their own product, but insure the flow of business from farm to factory, and factory to farm.

For information on the efficient and profitable use of

AMIJEL *for the beaters*

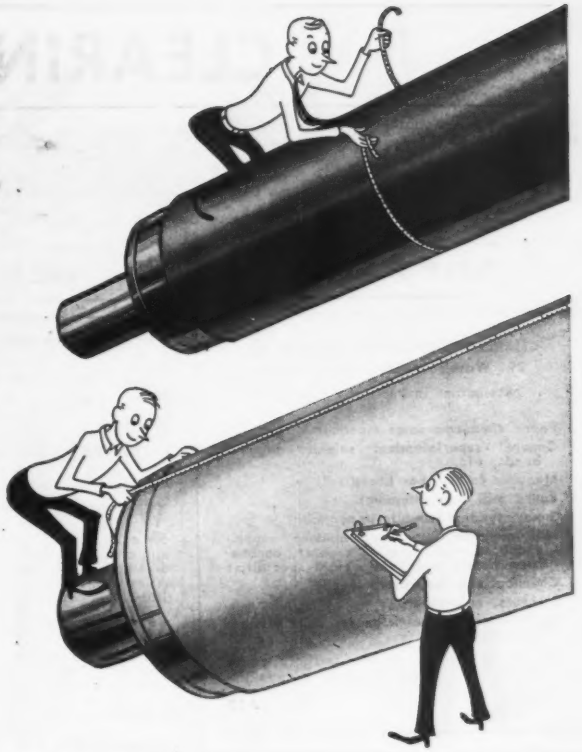
STARCH *for enzyme conversion*

LAM-O-DEX *for laminating*

CORAGUM *for corrugating*

consult Corn Products technical staff, without obligation.

CORN PRODUCTS SALES CO.
17 BATTERY PLACE • NEW YORK 4, N. Y.



Coated stock . . .

Tissue for gift wrapping . . .

60% rag content for business letterheads . . .

Whatever your production may be, remember this: the finish on the paper can be no better than the rolls in the calender. To assure you of the finish you desire Butterworth Calender Rolls are made to specification by a special process and locked on the shaft. A series of tests, with as many as 120 test readings make certain that you get the hardness, smoothness, and density you require.

Test Butterworth Calender Rolls in your own calenders. Place one refill in a stack with any other roll. Time it. Check its operation. Inspect it regularly. See for yourself the consistently better service you get from this roll. Consider the time and labor you can save by the longer life and finer quality of Butterworth Calender Rolls and Refills.

Butterworth Calender Rolls are made in all sizes for every type of calender, or we can refill your present rolls.

For full information, write or call H. W. Butterworth & Sons Company, Philadelphia 25, Pa. — Textile Finishing Machinery Company Division, Providence, R. I. : : Charlotte, N. C., 1211 Johnston Bldg. : : In Canada — W. J. Westaway Co., Hamilton, Ont.

Butterworth

CLEARING HOUSE

HELP WANTED—5c a word. Double rate for heavy face type. Minimum charge $1.25.
SITUATIONS WANTED—5c a word, double rate for heavy face type. Minimum charge $1.25. If repeated ½ rate will be charged for each consecutive repetition.

FOR SALE—5c a word. Double rate for heavy face type. Minimum charge $1.25.
WANTED—5c a word. Double rate for heavy face type. Minimum charge $1.25.
OPPORTUNITIES—5c a word. Double rate for heavy face type. Minimum charge $1.25.

Classified advertising space may also be purchased at $3.00 per single column inch.
All classified advertisements are payable in advance. If box number is used—33 cents additional.

Address replies to advertisements appearing under Box numbers in care of PAPER TRADE JOURNAL, 15 West 47th Street, New York 19, N. Y.

HELP WANTED

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St., Boston, Mass.

Specializing in Paper Mill Personnel
Positions Now Open

Paper chemicals sales manager
General superintendent sulphite papers, bonds, etc.
Manager folding box board mill
Board mill superintendent
Superintendent sulphite paper mill
Mill manager or superintendent experienced in manufacturing cigaret, carbonizing tissues and light weight specialties
Chemical and laboratory men
Erectors, millwrights
Engineer, also electrician for mill in Pennsylvania

We invite correspondence (strictly confidential) with executives seeking new positions and with employers seeking new personnel. **J-19**

PLANT MANAGER

An unusual opening is available for plant manager in a one-machine mill located in Pennsylvania, manufacturing folding boxboard exclusively. Compensation will be in five figures, plus profit-sharing bonus.

We are only interested in communicating with men having thorough experience in this field.

In your reply, give full details of experience, personal qualifications, etc. Address Box 47-436 care Paper Trade Journal. J-19

WANTED MECHANICAL ENGINEER

Skilled and experienced in industrial power plant design and steam and power studies. Good position for right man. Give training, experience, and salary expected. Location Michigan. Reply to Box 47-238 care Paper Trade Journal. TF

SALARIED POSITIONS

$2,500-$25,000. This thoroughly organized confidential service of 17 years' recognized standing and reputation carries on preliminary negotiations for supervisory, technical and executive positions of the calibre indicated. Retaining fee protected by refund provision. Identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
117 Dun Bldg., Buffalo 2, N. Y.

CHEMIST OR TECHNICIAN for pulp laboratory control and development work. Small amount travel required and some experience necessary. Give full particulars of experience, salary expected, when available and personal details in first letter. Metropolitan area. Address Box 47-423 care Paper Trade Journal. J-19

HELP WANTED

SALES MANAGER
With Mill Following
For Paper Stock
With
Leading Waste Paper Packer
Good Salary
Attractive Proposition
Box No. 47-268 care Paper Trade Journal
TF

WANTED FOREMAN—Rotogravure Dept.—Southern Converter will pay TOP SALARY for a Foreman who has outstanding Specialty Bag and Printing experiences. Excellent future. Give detailed experiences, present position, and salary. All information held strictly confidential. Address Box 47-444 care Paper Trade Journal. Jl-3

WANTED FOREMAN—Specialty Bag Dept. —Southern Converter will pay TOP SALARY for a foreman who has outstanding Specialty Bag and Printing experiences. Excellent future. Give detailed experiences, present position and salary. All information held strictly confidential. Address Box 47-443 care Paper Trade Journal. Jl-3

SALESMAN WANTED—Man wanted to sell chemical specialties to paper mills along Eastern Seaboard for old established manufacturer. Chemical training desirable but not necessary. Fine opportunity for right man. Address Box 47-440 care Paper Trade Journal. Jl-3

WANTED—Superintendent for 78" trim Fourdrinier paper machine running speed 500 to 700 feet per minute making light weight specialties. Address Box 47-457 care Paper Trade Journal. J-19

WANTED PLANT MANAGER—Mechanical preferred with pulp and paper mill experience desirable, for board mill in Indiana. Excellent opportunity for young man to grow with expanding organization. Write details of education experience and salary expected. Address Box 47-459 care Paper Trade Journal. J-26

EASTERN MILL WANTS experienced Board Salesman for New York Area. Excellent future. Address Box 47-447 care Paper Trade Journal. J-19

WANTED — Boss Finisher — Specialty Mill. Must be experienced in all phases of finishing and shipping. Ability to co-ordinate Methods and Procedures essential. Address Box 47-456 care Paper Trade Journal. Jl-3

WANTED — Supervisor of Finishing Department. Applicant to have experience in all Finishing Room Equipment—particularly a background of good labor relations and ability to get along in an organization, plus experience in job layout and efficiency in general Finishing Room procedures. Address Box 47-461 care Paper Trade Journal. J-10

WANTED—Thoroughly experienced toilet roll machine operator for 91" machine being delivered about July 1st. Address Box 47-462 care Paper Trade Journal. J-3

MACHINE TENDERS AND BACK TENDERS needed for Harper Fourdrinier Machine. Must be capable to handle paper by hand at a fast speed. Address Box 47-463 care Paper Trade Journal. J-26

SALES ENGINEER-CORRESPONDENT — To handle all correspondence and detail pertaining to sales of pulp and paper machinery. State experience and salary expected. Location New York City. Address Box 47-474 care Paper Trade Journal. J-19

ASSISTANT CHEMIST — Paper experience, good opportunity. Address Box 47-471 care Paper Trade Journal. J-19

CLASSIFIED ADS BRING RESULTS

SITUATIONS WANTED

BAG SPECIALTIES

Plant Supt. Production control work. Machine development. Assume complete manufacturing responsibilities. All type bags, envelopes, printing, etc. Cellophane glassine, coated papers, etc. Many years experience. Available immediately. Address Box 47-467 care Paper Trade Journal. J-26

MANAGER—Extensive experience in management and production of paper manufacturing and paper converting plants. Printing papers, facial tissue, cellulose wadding, waterproof, waxed, oiled and specialties. Address Box 47-446 care Paper Trade Journal. Jl-3

POSITION WANTED—As Superintendent or assistant superintendent of mill making Sulphite Bond, Book and Coating paper. Have had twenty two years experience as superintendent. Address Box 47-452 care Paper Trade Journal. Jl-3

ASSISTANT KRAFT PULP MILL SUPERINTENDENT or Tour Foreman—25 years experience of which 23 have been in supervisory work. Open for permanent or temporary employment. Will go anywhere. Excellent references. Address Box 47-454 care Paper Trade Journal. Jl-3

PULP AND PAPER ENGINEER — Experienced in development and production work. Desires position requiring initiative with progressive company. Address Box 47-453 care Paper Trade Journal. TF

PLANT MANAGER—Thorough experience in converting paper and boards; wants change to position offering better opportunity. Excellent production and labor relations background. Address Box 47-42 care Paper Trade Journal. J-26

SUPERINTENDENT — Desires position with progressive firm offering future opportunities. Can improve quality, lower cost and increase production. Age 39. Salary no object. Excellent reference. Address Box 47-420 care Paper Trade Journal. J-19

MR. PAPER BAG MANUFACTURER—Can you use a man who desires management for a career? ASSETS:—Loyal, honest, judicious, 20 years experience as a top notch adjuster. Address Box 47-397 care Paper Trade Journal. J-26

CHEMICAL ENGINEER—Experience in development, research and control in pulp and paper; desires position in research or control, preferably in south or southeast. Age 37. Excellent references. Address Box 47-441 care Paper Trade Journal. J-26

OWNER OR BUSY EXECUTIVE—Can you use a man in whom you can place great trust? 42; technical background, mature judgment, long experience in paper converting field. Address Box 47-460 care Paper Trade Journal. J-26

SUPERINTENDENT—With a utility training covering entire field, including Mechanical Engineering. Capable of laying out a revamping program to modernize or upgrade a Boxboard or Specialty Cylinder Mill. Address Box 47-435 care Paper Trade Journal. J-19

MAN, 39, with 35 years experience in paper making, desires connection with reliable company in the Tropics as Machine Tender, Boss Machine Tender or assistant superintendent, Tour Boss. Am steady, sober and reliable. Address Box 47-458 care Paper Trade Journal. Jl-10

Everything

FOR THE

PAPER MILL

While *Everything for the Paper Mill* is an all-inclusive expression and strictly interpreted is not 100 per cent true, the fact remains that it is not too remote from literal truth.

Black-Clawson and its several divisions and associates can and do build or supply almost everything required.

THE BLACK-CLAWSON COMPANY HAMILTON, OHIO

Division: SHARTLE BROS. MACHINE CO., Middletown, Ohio

Division: DILTS MACHINE WORKS, Fulton, New York

Associate: ALEXANDER FLECK LIMITED, Ottawa, Canada

SITUATIONS WANTED

PULP AND PAPER MILL ENGINEER for equipment layout, design, maintenance and operation, open for temporary or permanent engagement. Address Box 47-389 care Paper Trade Journal. J-19

PAPER AND PULP MILL SUPERINTENDENT, practical, years of supervisory experience. Age 55. Available July 1st. Will go anywhere. Address Box 47-464 care Paper Trade Journal. J-19

MECHANIC—Desire position as a Working Master Mechanic or a first class machinist job. 20 years experience in Paper Mills. Address Box 47-465 care Paper Trade Journal. J-10

WANTED—Position as Chief Power Engineer with a company that wants a man that can get results and cut expenses. 18 years experience. Age 40 and married. Address Box 47-466 care Paper Trade Journal. J-3

COST ACCOUNTANT desires change. Experience 15 years paper and bag manufacturing. Capable handling all accounting and office management. Will go anywhere. Address Box 47-470 Paper Trade Journal. J-26

FOR SALE

FOR SALE
2 COLOR ROTO
38" wide by 25" circumference. Sheet Fed Rotogravure Press. Two separate colors but not surprinted. Press run very little. Without automatic feeder or electrical equipment. Will easily convert into roll feed if desired.
PRECISE ENGINEERING COMPANY
400 W. Madison Chicago
TF

FOR SALE—One complete paperboard machine —62" trim with 6 cylinder moulds. Capable of making 40 tons daily of chip or lined boards from .012 to .040. Address Box 47-439 care Paper Trade Journal. J-19

EQUIPMENT FOR SALE—One (1) Kerr Steam Turbine No. 246 complete—Serial No. 772—400 B.H.P.—3600 RPM Directly connected to an Allis Chalmers Generator — Serial No. 102437—220 volt, 3 phase, 60 cycle, 3600 RPM and an Allis Chalmers Exciter direct connected, Serial No. 92347. Write Sangamon Paper Mills Inc., 137 W. Pershing Rd., Chicago, 9, Illinois. J1-3

FOR SALE

FOR SALE

Our listings contain over 60 machines in stock for immediate delivery—write for this and future monthly bulletins describing available:

SLITTERS; REWINDERS; PAPER CUTTERS; PRINTERS; DIE CUTTERS; GLUERS; COATERS; SCORERS; CREASERS; CELLO. WRAPPERS;—ALL ARE WELL KNOWN AND STANDARD TYPES OF PAPER CONVERTING & PAPER BOX MACHINES. COMPLETE SET-UP BOX PLANTS NOW FOR SALE. WRITE FOR FREE BULLETINS—GET ON OUR MONTHLY MAILING LIST.

SOUTH WABASH ENGINEERING CO., INC.
2937 South Wabash Avenue
Chicago 16, Illinois
Telephone Victory 7169
J-31

FOR SALE

BEATERS
1—2000 lb. Holyoke-Iron Tub Beater.
3—1200 lb. E. D. Jones (no tubs).
1—1000 lb. Dayton Beater (no tub).
1—500 lb. Beater—iron tub.

BLOWERS
3—Buffalo Forge Company—Size 7—Duplex Conoidal steel plate Blowers. Ball bearing.

CALENDER STACKS
1—5 roll—72" face.
1—7-roll 36" Holyoke Machine (supercalender).

CENTRAP
1—Shartle Brothers Centrap.

CHIPPER
1—50" Murray Chipper (8 knives).

CREPING MACHINE
1—86" Waldron Creping Machine, practically new.

CYLINDER MOULDS
1—30" diameter x 74" face.
3—30" diameter x 54" face.
1—30" diameter x 75" face.
3—36" diameter x 84" face.
1—36" diameter x 80" face.
3—30" diameter x 72" face.

DOCTORS
14—Dillon Doctors — complete with accessories—98" face.

DRIVES
1—General Machine Company 16 : 1.
1—[illegible] Downgrinder inclined drive, ratio 6 to 1—with clutch and cone pulley for paper machine.
1—Cleveland Worm Drive. Ratio 10 to 1.
2—Smith & Winchester mortise gear. Drives.
1—D. O. James 75 H.P. Speed Reducer with couplings and motor base. Ratio 2 16 to 1. 900 RPM.
1—#1 Reeves Drive.
1—#2 Reeves Drive.
1—#3 Reeves Drive.
4—Horton vari-speed Pulleys.
3—Foote—7½ h.p. Speed Reducer (Ratio 240 to 1).

DRIVES (Angle)
1—Philadelphia 50:1—1 h.p.—1200 r.p.m.
3—Philadelphia 21½:1—3 h.p.—1200 r.p.m.
1—Link Belt 25:1—r.p.m. input 1150—r.p.m. output 46, including 7½ h.p. G.E. totally enclosed motor.

V-BELT DRIVE
1—21¾" diameter x 7½" face, 5 groove.
1—16½" diameter x 7½" face, 5 groove. (With clutch)

DRYER SECTIONS
8—Dryers 36 x 64 with frames, bearings, gears, felt roll, base plates, etc.
5—Dryers 36 x 72, complete with frames.

DRYERS
8—48" diameter x 118" face.
1—28" diameter x 76" face.
1—48" diameter x 94" face.
3—25" x 120" (Baby Dryers).
1—48" x 100".
3—24 x 72 (Copper face, textile type).
3—24" diameter x 50" face.

ERKENSATORS
4—I. W. E. Erkensators—bronze construction—complete with motors, starters and distributing box.

FLAT SCREENS
2—12 plate Flat Screens.
1—4 plate Flat Screen.
1—6 plate Flat Screen.

HYDRAFINER
1—Dilts Hydrafiner (1200 r.p.m.)

HYDRAULIC PRESS
1—350 ton Buterworth Hydraulic Pulp Press —platen 42 x 65"—8' daylight.

JORDANS
1—Noble & Wood, Pony Monarch, Belt Driven.
1—#2 Miami.
1—No. 9 Emerson Jordan—for direct connection to a motor.
1—Noble & Wood Monarch.

KNIFE GRINDER
1—96" Rogers Knife Grinder.

LAMINATING MACHINE
1—50" Laminating Machine—with 3 dryers.

PULLEYS
Various cone and assorted pulleys.

PULP EQUIPMENT
1—32" three pocket Glens Falls Grinder (for 27" wood).

PULP SCREEN
1—IMPCO centrifugal pulp screen design No. 3.

PULPER
1—Jones Pulper.

PULVERIZER
1—Erie coal pulverizer.

PUMPS
1—Buffalo Pump—5500 g.p.m. (50' head).
4—Vertical Schutte & Koerting Acid Pumps (with motors)
3—Goulds—2 stage—420 g.p.m.—1010' head
1—Gardner Denver 4 x 6—including 15 h.p. totally enclosed motors—700 g.p.m.—72' head (new equipment).
2—Weil Pump Co.—100 g.p.m.—100 P.S.I. including 15 h.p. motors (new equipment).
1—Bell & Gossett—600 g.p.m.—100' head—including 25 h.p. motor.
1—Bell & Gossett—300 g.p.m.—120' head—including 15 h.p. motor.
1—Goulds Sump Pump—50 g.p.m.—20' head —including motor.
Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.

REELS
1—72" Downingtown Expansion Reel.
1—2 Bowl Reel—110" face.

ROLLS
560—Brass tube-steel tube—rubber covered iron rolls—various sizes

SCREEN PLATES
20 Plates cut .016.
10 Plates cut .008.
Also other sizes and cuts in stock.

SHEETERS
1—48" Langston heavy duty chopper (this is a combination machine, combining a slitter, scorer, sheeter and chopper.

SHREDDERS
1—Gilman Shredder.
1—Waterville Shredder

SLITTERS AND WINDERS
1—Cameron Type 24-2A—42" face.
1—Cameron Type 6—42" face.
1—Cameron—Type 10—72" face.
1—114" Kidder.
1—30" Langston
1 36" Beck Razor Blade type Slitter & Winder.

STACKERS
1—Economy Engineering 2000# capacity—with motor.
1—Economy Engineering 1000# capacity—hand operated

STOCK PUMPS
1—10 x 12 open impeller. (All lead).
1—8 x 10 Moore & White Triplex.
Numerous other Centrifugal Stock Pumps. Advise as to your requirements.

SUCTION COUCH ROLL
1—18" diameter x 100" drilled face.

SUCTION FELT ROLL
1—Nash 110" Suction Felt Roll

TOILET EMBOSSER
1—84" Embossing Toilet Roll Winder.

VACUUM PUMPS
1—No. 1 Nash Hytor Vacuum Pump.
1—No. 7 Sturtevant Vacuum Pump
1—14 x 20 Connersville.
1—18 x 28 Sandusky.
1—Sandusky 8 x 10.

WET MACHINES
1—74" Moore & White

YANKEE DRYERS
1—8' diameter x 120" face.
1—8' x 175" face.

We are always in the market to purchase your surplus or idle machinery. What have you to offer?
Wanted Cylinder and Fourdrinier Machines (complete mills).

Paddy Ross, Pres. **J. J. ROSS COMPANY** Ben Kurs, Treas.

250 Frelinghuysen Ave. Tel.—Bigelow 3-3720 Newark 5, N. J.

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CABLE ADDRESS: JACKROSS

ROSS PAPER MACHINERY CORP.

265 PASSAIC STREET
NEWARK 4, N. J.

CONVERTING
PAPER MAKING EQUIPMENT

NEW, USED, REBUILT
PAPER AND PULP MACHINERY

JACK ROSS, Pres.

1—New Beloit 22" diameter Suction Couch Roll for 119" wire width with 115" suction opening.

1—Beloit 22" diameter Suction Couch Roll for 111" wire width with 107" suction opening.

BALING PRESS
1—Lodemann Brothers Model #5—MTX. Requires 3 h.p. motor.

BEATERS
1—6000#-roll 38" face x 36" dia.
2—750 lb. Horse Iron Tub, Roll 60"x40"
1—1200 lb. c. I. Jones Beater—no tubs.
1—1200 lb. Noble and Wood—no tub Spare new fillings for roll.
3—Valley Iron—Roll 67" diameter x 60" face—wood tub.
4—E. D. Jones 2000# iron tub—with Warren hydraulic lighter bolats, Roll 67" dia. x 60" face.
1—Breaker Beater—Iron Tub—35 ton capacity.

BEATER ROLLS
1—48" face x 48" diameter.

BIRD SCREEN PLATE
17 Plate—60 cut. New condition

BLEACHERS
1—Fletcher high density bleachers used 3 months.

BLOWERS
3—Wilbraham-Green Rotary Positive Blowers and Gas Exhauster.
1—Sturtevant #8.
1—American 8 rooo Size 4.
2—American Blowers #300.
1—American Blower #700.
1—American Blower #750.
1—Buffalo Size 40.
4—Buffalo Forge Co. #24 Cast Iron Blowers.
3—Buffalo Size 4.

CALENDERS
1—39" Textile Mashy. Co. 3 roll Finishing Calender.

CALENDER DOCTORS
1 set of 18 Warren Doctors 100" face with frames.
80 Warren Doctors—various sizes

CALENDER ROLLS
10 rolls various sizes

CALENDER STACKS
1—2 roll Holyoke 38" face.
1—Pusey & Jones 9 roll 64" face.

COMPRESSOR
1—Nash—Gas or Air Compressor—Type MD 671. Capacity 40 CFM at 105". Direct connected to 5 h.p.—1750 r.p.m.—440 volt motor.

CONTINUOUS TRAVEL CUT-OFF
1—Langston 74" r.h. Type S. Continuous Travel Cutoff, with change gear box.

CONVERTING EQUIPMENT
3—Sanitary Napkin Machines. With motors and starters.
1—Miller Double Head Slitter.
3—Cameron Type 72" Towel Converting Machines.
1—45" Hudson Shaw Facial Tissue converter—with embossing attachment.

COUCH ROLLS
1—19½" diameter x 62" face—brass covered.
1—20" diameter x 62" face—brass covered.

CYLINDER MOLDS
1—44" face x 30" dia.
1—72" face x 30" diameter.
1—76" face x 30" diameter.
2—84" face x 36" diameter.

DRYER DOCTORS
40—Warren Doctors. Various sizes

DRYERS
2—24" Dia. x 48" Face
1—24" diameter x 72" face
5—74" face x 29" diameter with gears and bearing
15—New 120" face x 48" diameter dryers.

FLAT SCREENS
1—Harmon 16 plate.
1—Montague 6 plate. Ball bearing.
1—12 plate Bagley & Sewall Flat Screens with scrapers and spare set of plates.
6—8 plate Sandy Hill Flat Screens

FORK TRUCK
1—MobileLift—Gasoline—Lift 72".

FOURDRINIER SHAKES
—Beloit Fourdrinier Shakes

FOURDRINIER WET END
1—150" Pusey & Jones.

HAMMERMILLS
1—American Hammermill—87" anti friction bearing equipped.
1—Williams 18" Hammermill Ball Bearing.

HOG
1—Mitts & Merrill Hog. 12" x 12".
1—Fitchburg 7 x 9. Ball bearing.
1—Mitts & Merrill.

JORDANS
2—#2 Black-Clawson. For motor drive.
1—E. D. Jones Imperial—direct connected to 550 volt motor—with starter.
1—Dillon—25 ton capacity.
1—Dillon #2—50 ton capacity.
3—E. D. Jones Standard Ball Bearing direct connected—75 H.P. 440/3/60 motor.

KNIFE GRINDER
1—84" Covitt & Hanchett with 7½ HP motor. Purchased new—1945.

KNOTTERS
1—Wells Knotter.
2—Trimbey Knotters

MOTORS
1—G.E. 200 h.p.—550 volts—3 phase—60 cycle.
1—Westinghouse 40 h.p. 900 r.p.m.—3 phase—60 cycle—440 volts—with starter.
1—G.E. 5 h.p. 1800 r.p.m.—3 phase—60 cycle—220 volts—with starter.
1—G.E. 75 h.p. 575 r.p.m.—3 phase—60 cycle—440 volts—with starter
1—G.E. 100 h.p. 573 r.p.m.—3 phase—60 cycle—440 volts—with starter.
1—G.E. 50 h.p. 690 r.p.m.—3 phase—60 cycle—440 volts—with starter.
1—200 h.p. 285 r.p.m.—440 volts—3 phase—60 cycle.
1—800 Ampere Westinghouse Generator. New.
3—G.E. Slip Ring—125 h.p.—690 r.p.m.—440 volts.

PLATER
1—Holyoke 2 Roll 18" dia. 38" face.

PULLEYS
40—Cone Split and Solid Cast Iron Pulleys Various Sizes

PULP EQUIPMENT
1—128" face Kamyr Press
1—72" Sumner Disc Barker with motor.
2—IMPCO Pulp Screens
3—Trimbey Knotters
2—Apmew Pulp Screens
1—Jigger—1 deck—vibrating screen.
1—Zaremba Triple Effect Evaporator — 84" diameter.
1—Mitts & Merrill #17 Pulpwood Chipper.

PULPERS
1—Voith Pulper 20 tons cap.
1—Bird Pulper.

PUMPS
3—Worthington Pumps 10,000 g.p.m.—25' head. Requires 3 h.p. at 58[illegible] r.p.m.
6—Warren Vertical Pumps. 6" by 3". 135 g.p.m. 80' head. Direct Connected 6 h.p. motor 440 volts.
3—Worthington 3", 2 stage, 200 g.p.m. 224' head. Bronze Ball Bearings.
1—American Marsh 200 g.p.m.—50' head—3" suction 2½" discharge
3—De Laval Verticals—840 g.p.m. 1740 r.p.m. —30' head 5" x 3". Direct connected to 7½ h.p. 440 volts.
1—6" Pusey & Jones Open Impeller Centrifugal Stock Pump—belt driven.
1—3" Large Size Pump—belt driven
1—Worthington Monoblock—250 g.p.m.—130' head —direct connected to 15 h.p.—3500 r.p.m.—220/440 volts, totally enclosed, ball bearing motor.
1—Terry Marsh 750 g.p.m., 250' head. Requires 125 h.p. motor.
1—Ingersoll Rand all bronze 175 g.p.m.—40' head
1—Worthington 3"—200 g.p.m —3350 r.p.m —480' head.
1—New Goulds Pump—75 g.p.m.—70' head—3 x 1½—for motor drive.
2—New Goulds Pumps—150 g.p.m.—80' head—3 x 2—for motor drive.
1—New Goulds Pump—500 g.p.m.—60' head—6 x 4—for motor drive.
1—Ingersoll Rand 500 g.p.m.—90' head—direct connected 15 h.p. 220-440 volt—3 phase—60 cycle totally enclosed motor.
1—Ingersoll Rand—50 g.p.m.—210' head—direct connected 7½ h.p.—220-440 volt—3 phase—60 cycle totally enclosed motor.
1—Roper Heavy Liquid 85 g.p.m.—54 lb. head.
1—Hayton 600 to 900 g.p.m.—25' to 20' head —ball bearing V-belt drive.
3—Lawrence 50 g.p.m.—60' head with extended base—ball bearing.
1—Quimby Sump Pump—100 g.p.m.—20' head—24" drop with 3 h.p. 220-440 volt 3 phase 60 cycle motor.

Sustaining Member

REDUCERS
1—Jones Worm MAAG Vertical Reducer. Ratio 248 to 1. Serial #205661.

REFINERS
1—Weiner Refiner 44" with extended base to direct connection to motor, and a large lot of new spare parts

ROLLS
15—Brass 240" face x 9¾" diameter. 12½" journals.
75—Steel—160" face x 7" diameter.
17—Brass—118" face x 9" diameter.
200 Assorted rolls.

ROTARY SCREENS
1—#1 Bird with steel vats, used two years
3—Moore & White
5—Bird Rotary Screens. Cylinder 36" dia. x 90" face. Copper vats.

RUBBER PRESS ROLLS
1—120" Face—19" Diameter
1—119" face x 19½" diameter.
1—100" face x 18" diameter

REELS
1—192" Pusey & Jones Single Drum Reel.

SHEETERS
1—97" Finlay Duplex 12 roll backstand with layboy.
1—51" Hamblet Single Knife 12 roll back stand with layboy.
1—120" Hamilton Duplex
1—184" Hamblet
1—63" Hamblet Duplex Rotary Cutter—12 roll backstand with M & W layboy.
1—80" Hamblet with 6 roll back stand and motor.

SHREDDERS
2—24" Sprout Waldron heavy duty shredders—anti friction bearing equipped.
1—Taylor Stiles Portable Pulp Shredder—on wheels.
1—Ryther and Pringle Shredder.
5—36" Mitts & Merrill with 125 h.p. motors and starters.

SLICES
2—E. D. Jones Flexible Slices.

SLITTERS AND WINDERS
1—40" Waldron—2 drum.
1—42" Cameron Slitter with 30 knives and motor
1—120" Moore & White 4 drum slitter and re winder—rebuilt.
1—106" Pusey & Jones Slitter and Rewinder with Unwind Stand.

STONITE PRESS ROLL
1—Stowe Woodward 111" face x 22" diameter

STUFF PUMPS
1—Dillon 7½ x 12" duplex
1—Moore & White Duplex 8x12".
1—Shartle 8" single plunger
1—3/2" x 3" Worthington Triplex.
1—Beloit Duplex—8 x 18".
1—10 x 20 Triplex.

SUCTION FELT PIPE
1—Seefield Suction Felt Pipe.

SUPERCALENDER STACKS
1—7 roll Norwood—57" face. Complete with drive
1—72" 9 roll Norwood—complete with drive.

TRIMMERS
1—38" Undercut Trimmer.
1—50" Undercut Trimmer.
1—84" Undercut Trimmer.
1—44" Seybold Holyoke Trimmer.

TUBE WINDING MACHINES
9—120" Tube Winding Machines—4½" Mandrels —New.

TURBINES
1—Westinghouse 125 h.p. 125 steam pressure 15 back pressure Complete Used [illegible]

VACUUM PUMPS
2—14" x 20" Connersville
1—Nash Hytor Size MD 671. Direct connected to 1½ h.p. 220/440 motor.

VOITH INLET
1—112" Voith High pressure stock inlet, equipped with distributor breaker roll.
1—141" Voith Inlet with distributor roll.

FOR SALE | FOR SALE | FOR SALE

FOR SALE

BEATERS
4—88 x 60 Holyoke iron tub
3—72 x 44 Noble & Wood, no tub
2—52 x 42 Downingtown, iron tub

CALENDERS (SUPER)
1—88" nine roll Holyoke, anti friction
1—85" nine roll Holyoke anti friction
1—86" nine roll Holyoke
1—82" seven roll Textile

CREPER
1—72" creping machine, five 42 x 78 dryers

CUTTERS
1—84" Clark with layboy
1—100" Dillon with layboy
1—72" Finlay with layboy
1—50" Finlay
1—50" Clark

DRIVES
1—Waterbury, size 10, type C
1—Waterbury, size 20, type C, rebuilt

DRYERS
1—36 x 154"
3—28 x 114"
4—36 x 108"
1—48 x 98"

ENGINES
2—Sturtevant V 57—10" x 9", 80 HP.

FOURDRINIER PARTS
1—110" Fourdrinier with three sets presses 109 x 20

GRINDER KNIFE
1—62" Seybold
1—45" Springfield

JORDAN
2—Union
2—Horne
1—Claflin No. 2
3—Brushes

HOT MELT SYSTEM
1—Wolverine

KETTLES & TANKS
2—300 gal. jacketed, 100 lb. pressure
1—75 gal. copper jacketed
3—
1—16 ft. dia. conical settling tank

PRESS PARTS
3—Sets 100" x 20" dia.
2—Sets 120" x 18"
2—Sets 150"

PULPER
1—No. 3 Lamaye
1—No. 1 Lamaye

PUMPS
1—10 x 12 Deane triplex rebuilt
1—7½ x 6 Goulds triplex, hydraulic No. 41544
1—7½ x 6 Deane triplex hydraulic

PUMPS (VACUUM)
1—Chicago pneumatic

RIFFLER
1—13, 14 and 15 ft. new system

SCREENS
2—No. 3A Bird
3—Moore & White No. 2
4—12 plate Packer flat
1—6 plate Packer
1—No. 2 Bird
1—Jones Leithwalk
3—12 plate
1—3 plate Valley

MOTORS
1—two cylinder Lancaster
1—three cylinder APMEW, motud 50 x 100

SLITTERS AND WINDERS
1—150" Moore & White four drum
1—114" Kidder two drum

FRANK H. DAVIS CO., 175 Richdale Ave., Cambridge, Massachusetts TF

1—30" Kidder Model SL Shear Cut Slitter and Rewinder.
BOS Bag Machines making 1, 2, 3, 7, 8 & 10 lb. bags.
1—52"; 1—60"; 1—64" Waldron Brush Coaters. Festoon equipment. New J. O. Ross Drying Oven. 5 Buffalo Blowers. New winding reel. Motor equipments.
1—Sheridan Die Press 27x44"—rebuilt.
1—14 x 16" Horizontal Twin Variable Speed Engine.
Power Paper Cutter: 1—44" 20th Century Seybold; 1—34" late Oswego. 1—54" Seybold Holyoke Mill Type.
6—Potdevin and 1 Lockport flat and square bag machines, complete with motor equipments, making bags from ¼ to 35 lbs.
1—64" complete creping machine.
2—#2 Lanoye Pulpers.
1—53" wide Hamblet Vickery Layboy.
1—36" Beck Shear Cut Slitter and Rewinder.
1—60" and 1—50" seven roll Holyoke Calender Stacks.
1—60" Hammersley Score Cut Slitter & Rewinder.
1—51" Hamblet Rotary Sheeter with slitting attachment, Moore & White layboy and 8 roll backstand.
4—Rotary Embossing Machines, 33" wide.
1—Laminating machine 96" wide. Will laminate sheets any length up to 150" by 1" variations. Suitable for laminating paper or board.
1—7"x8" Gould three plunger stock pump, with bronze fittings.
1—26" Waldron 8 Color Wall Paper Printing Press, with Jolly static eliminator, 50 ft. turn around dryer, blower and AC motor equipment.
1—74" Black-Clawson Single Rotary Sheet Cutter.
1—Morrow Wrapping and Sealing Machine. Complete with motor and controls. Capacity 450 packages per hour.
1—52" Cameron, type 40-1AF. Slitter and Rewinder.
1—Bagley & Sewall 30 x 72" Wet Machine.
1—24" Model B Fales Slitter & Rewinder. Two sets of 3/16" Knives. 5 HP. AC Motor & Reliance Drive.
1—94" Moore & White Duplex Rotary Sheeter.
1—Paper Converting Machine Company's Towel Interfolder.
1—Farrel-Birmingham 30x160" Roll Grinder, 20' bed.

GIBBS-BROWER COMPANY, INC.
21 East 40th St., New York 16, N. Y. TF

FOR SALE

1 Noble and Wood Mammoth Jr. Jordan, arranged for belt drive, capacity 1 ton per hr.
1 Noble and Wood Mammoth Jr. Jordan, arranged for direct connection to motor, less motor, capacity 1 ton per hr.
1 Westinghouse geared speed changer, ratio 3 to 1, 175 H.P. Type SVR-13
1 Westinghouse geared speed changer, ratio 1 to 1, 175 H.P. Type SVR-13
2 Riley 5 rotort stokers with steam engine drive
1 4000# capacity motor driven freight elevator with automatic stop control—can be inspected in operation at our plant.
1 120 inch slitter & scorer (fully equipped) Knowlton 60 x 120
1 Hamlet sheet cutter 82 inch knife
1 Oswego Paper Cutter 63 inch knife (A-1 condition)
1 Hobbs double scoring machine
1 Hobbs Fly machine
1 Hobbs Ender
1 Hobbs double corner cutter
1 Hobbs hand topping machine
1 Potdevin hand label glueing machine
1 Knowlton #7 single corner stayer
1 Model F-23-T Elwell Parker Lift Truck, fork type complete. Extra battery charger, and extra battery 15 cell 21 plate, type TLM Exide (New) 4000# capacity
1 6 plate packer Screen (Sandy Hill)
1 Camaschine #6 model 1A
1 Carrick combustion controls for two boilers to be sold as unit.
1 82" Moore & White Rotary Cutter Duplex
1 #4 Reeves Drive open
1 #5 Reeves Drive open
1 Shepard Elevator, motor driven 1 H.P. 1 ton capacity
1 Shepard Elevator, hand operated 1800 lbs. capacity
1 Ton Elevator motor driven ½ H.P.
1 Deming 3½x4 triplex plunger pump
1 Lawrence 6 inch double suction water pump
2 8x12 inch Moore & White Duplex pumps
3 Downingtown Fan Pumps 6"
1 Ingersoll Rand Stock Pump (New) 10x6
1 Ingersoll Rand Stock Pump New) 12x6
1 Brass covered finishing press roll 17¾ inch dia. x 89½" face complete with bearings and Noble and Wood friction drive
10 100" phosphor bronze No. 2-A Bird Screens .022" slots never used after being reset once
12 6½ dia. x 92" face steel dryer felt rolls, 1 3/16" journals
1 750 GPM underwriter's fire pump, steam driven (complete)
1 Wagner Motor, 1 phase, type 14TBA, 5 H.P., 60 cycle, 1750 R.P.M. Numerous large dia. steel and cast iron pulleys
Numerous elbows and tees for 5, 6, 8, 10, 12" spiral rivetted pipe

A visit to the mill would prove profitable as we have many items for sale too numerous to mention. See J. R. Stephenson, Plant Engineer at our plant in Walloomsac, New York.

WALLOOMSAC PAPER MILLS, INC.
Mills: Walloomsac, New York
Main Office: 25 Vanderbilt Avenue
New York 17, N. Y.

BOARD MACHINE
FOR SALE

45 DRYERS 36x72 FRAMES
4 Sets—Primary Presses
2 Sets—Main Presses
2 Sets—Calenders
1—2" Drum Winder Drives and other parts.

Can be had at once.

Box No. 47-450
Care of Paper Trade Journal
J-19

The Teall Continuous Automatic Facial Tissue Folder and Cutter cuts waste to less than ½ of 1%. Adjusable for various widths and lengths. Converts carload in 8 hours. Further details and photos Box 47-475 care Paper Trade Journal. J-10

MACHINERY FOR SALE

110" Hamblet heavy duty Mill Type Sheeter.
54" Inman shear cut Slitter.
84" Brown & Carver hand clamp Power Cutter.
44" National Automatic Power Cutter, rebuilt.
78" Meisel two color rotary.
25 x 38 Babcock Cylinder Press. 3-roller.
29 x 29 six-rod Standing Press.
14 x 22 John Thomson.
American heavy duty Cross Cut Saw.
Bunn Tying Machine.
Baling Presses—NEW—both hand and power.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 18, N. Y. TF

FOR SALE OR LEASE—Paper Mill Site and Building in the Eastern Area with low power rates, railroad sidings, unrestricted area, low taxes, labor available, water plentiful. Perfect for mill up to fifty tons daily. For full details write Box 47-473 care Paper Trade Journal. J-3

FOR SALE—Beloit 62" Cut-Off Knife. Excellent condition. $1500.00. Address Box 47-472 care Paper Trade Journal. J-10

FOR SALE—1 Hamilton-Corliss Variable Speed Twin Engine, size of cylinders 12" x 24". Also Triple-Deck Frames for ninety 36" dryers, any width. The Chesapeake Paperboard Co., Baltimore 30, Md. TF

CLASSIFIED ADS BRING RESULTS

FOR SALE

1—170" Fourdrinier consisting of 18" dia. breast roll, 24" dia. suction couch roll, 5 bronze suction boxes, 28 new rubber covered fourdrinier rolls, 6—8⅛" dia. wire rolls. All mounted on anti-friction bearings.

1—8 ft. dia., 175" face Yankee Dryer, 6—4 ft. dia., 160" face Black & Clawson Dryers, 1—170" Moore & White Slitter and Winder.

Will sell separate or assemble above complete machine

1—Lobdell No. 3 Roll Grinder complete with motors. Will grind rolls up to 30" dia., 180" face.

12—New dryers 48" dia., 86" face, complete with bearings, gears and steam joints. Can furnish frames if desired. Immediate delivery.

10—Steel dryers, 30" dia., 80" face. Can furnish gears, frames and bearings.

1—36" dia., 72" face Moore & White Dryer.

1—48" dia., 120" face, Moore & White Dryer.

1—48" dia., 86" face Bagley & Sewall Dryer, ground for crepeing doctor.

2—E. D. Jones 88# Beaters, rolls 50" dia., 44" face, machined slots, good fillings.

1—E. D. Jones Beater roll 62" dia., 48" face, machined slots, New fillings.

1—Emerson Jordan comparable to E. D. Jones Leviathan, designed for direct connecting.

2—No. 2 Bird Rotary Screens, copper vats, plates cut .018.

1—Black & Clawson single press Cylinder Mould 30" dia., 74" face. New vat.

3—Cylinder Moulds 50" dia., 90" face.

6—Cylinder Moulds, 30" dia., 72" face.

40—Brass covered Felt Rolls 6⅝" dia., 72" face.

36—Fourdrinier Wire Rolls 6⅝" dia., 96" face. Will shorten these to fit your machine.

20—7" dia. Aluminum Covered Table Rolls, 172" long. Will cut these to make 2 rolls 86" face or less.

20—Sets New 2-Ton Yale & Towne Chainfalls, with special 20 ft. lift chain.

1—14 ft. Globe Rotary Digester, complete with Falk gear reduction.

2—100 H.P. General Electric, 550 volt, 3 phase, 60 cycle motors, 720 RPM.

1—150 H.P., A. C. Generator, complete with 250 volt, 300 amp. switchboard.

1—Taylor-Stiles Rag Cutter. Head equipped with three 28" knives.

2—B. F. Perkins Rag Cutters. Excellent condition.

5—Gould Shower Pumps 3" inlet, 2" outlet, 100 GPM, 104 ft. head, direct connected to 5 H.P., 3 phase, 60 cycle, 440 volt motor.

7—Roberts 2-pocket Pulp Grinders.

2—Norton Pulp Stones 27" x 52".

1—New Gould triplex Water Pump, Fig. #1712, 5" x 8" stroke, back-gear driven.

1—Gould 8" x 8" Triplex Water Pump, Fig. #924.

2—Shartle 10 x 20 Triplex Plunger Stock Pumps.

2—Shartle 8 x 16 duplex Stock Pumps, inlet chamber divided so it handles two grades of stock.

1—10 x 18 Connersville Vacuum Pump.

1—Calender Stack 108" face with 7 rolls, bottom 20" dia., top 14" dia. Intermediates 9" dia.

6—Sets New Wright 3-Ton Chainfalls with special 20 ft. lift chain. In original boxes.

2—Sets New 10-Ton Chainfalls with anti-friction bearing trolleys. One-half price.

1—Impco Tailing Screen. Like new.

EVERY POUND OF PAPER IS MADE ON USED EQUIPMENT

OSBORNE PAPER MILL EQUIPMENT CORP.

FULTON, N. Y.

J-19

TARENTUM PRODUCTS CORPORATION

Tarentum, Pennsylvania

FOR SALE—Wonderful buy of following equipment and materials to highest bidder. We reserve the right to accept or reject any bids that are made.

Item No.	Qty.		Price
1	1	104" Sheet cutter complete with stands for 10 rolls, and laybey. This is a Moore & White simplex cutter. Also has complete set of joggers for laybey. Have DC electrical equipment for above.	$4000.00
2	1	Daniel Rag Cutter #2—Complete with five cylinder Holyoke Duster.	$ 700.00
3	1	R40 Reducer, 12 to 1 ratio	$ 127.00
4	1	Slat Conveyor steel construction 4' wide, 3' high, 42' long, driven by one Jones Spur Gear Reducer, ratio 27 to 1, serial 18135. Driven by one Sprang Electric DC Motor type LC 10 HP 57.2 amps. 230 V. 100 RPM Ser. DL 2096213, complete with sheaves and V Belt drive, one Westinghouse Automatic Starter.	$ 425.00
5	1	John Waldron Corrugated & Embosser #711, 52"	$2000.00
6	1	Thorpe Hydraulic Press complete with 4 steam platen plates 40" x 40"	$2100.00
7	1	Viscolizer Pump for above press.	$1200.00

MISCELLANEOUS

8	2	Platform Scales.	$ 50.00
9		Paper Testing Equipment.	$ 250.00
10		Two-wheeled hand trucks.	$ 60.00
11	1	set—Black and Clawson Calender Stands complete with bearings and 8 rolls, 85" face.	$3150.00
12	1	set—Black and Clawson Calender Stands complete with 9 rolls, 100" face.	$3850.00
13	1	set—2 speed reels, vertical extension 9' 2" face.	$ 800.00
14	1	set—Vertical reels, 2 speed, 7' 2" face.	$ 600.00
15	1	Whiton Steam Turbine used for driving induced pressure fan for boiler. Whiton Turbine type BC, #1985 steam pressure 140 to 250 lbs., speed 1480, back pressure 7 lbs., HP 23 GOOD CONDITION.	$ 450.00

MISCELLANEOUS SUPPLIES

CORES:

280 pcs.—6" I.D. 21½" long ½" wall—NEW	
35 pcs.—6" I.D. 18" long ½" wall	
100 pcs.—6" I.D. 24½" long 7/16" wall	
110 pcs.—6" I.D. 36" long ½" wall	
170 pcs.—6" I.D. cores 33½" long ½" wall	
250 pcs.—Wooden cores 30" long 10" dia. 3¼" sq. hole.	

CORES WITH STEEL ENDS 3" I.D. Hole

29 pcs.—21½"	
17 pcs.—21"	
19 pcs.—22½"	
5 pcs.—28"	
2 pcs.—24½"	
3 pcs.—31¾"	
3 pcs.—28½"	

CORES WITH STEEL ENDS 6" I.D. Hole

28 pcs.—40"	
5 pcs.—63"	

CORES:

3880 pcs.—1½" x 4	$24.00
2900 pcs.—1¼" x 5	18.00
2530 pcs.—1½" x 6	18.00
876 pcs.—1¼" x 14	6.50
560 pcs.—1¼" x 10	12.00
773 pcs.—1¼" x 13	16.00
415 pcs.—1¼" x 25	24.00
2106 pcs.—1¼" x 9	9.00
218 pcs.—1¼" x 29	.00
1730 pcs.—1¼" x 3	8.00
2200 pcs.—1¼" x 1½	14.00
884 pcs.—1¼" x 18	8.00
300 pcs.—1¼" x 15	6.50
2275 pcs.—1¼" x 2	8.35
1125 pcs.—1¼" x 3½	4.00
650 pcs.—1¼" x 3¼"	10.00
2700 pcs.—1¼" x 2½"	14.00
6300 pcs.—1¼" x 1"	5.00
550 pcs.—1¼" x 8"	4.20
750 pcs.—1¼" x 5½"	8.00
475 pcs.—1¼" x 12	3.00
60 pcs.—1¼" x 36	4.50
575 pcs.—1¼" x 7	1.50
480 pcs.—1¼" x 2¼	

ADDING MACHINE PLUGS:

25 bags—2 5/16" long 1⅛ O.D.—7/16" hole (950 per bag)	
2 bags—standard size	

DIE WIPE PLUGS

2 bags—1½" hole 2½ plug	85.00

TARENTUM PRODUCTS CORPORATION, Tarentum, Pa. **Contact Mr. J. V. Mason, Tarentum 1470**

TF

FOR SALE

FOR SALE

1—Chandler Taylor 2 cylinder engine 11" x 11" steam 150 lb. r.p.m. 250.
1—Chandler Taylor 2 cylinder engine 12" x 12" steam 250 lb. r.p.m. 230.
1—Harrisburg Uniflow Engine, cylinder 20" dia. 20" stroke 120 lb. steam 240 h.p.
Address Box 47-313 care Paper Trade Journal. TF

GOOD VALUES FOR THE PAPER MILL

NEW 44" National Automatic Cutters, ready for immediate delivery.
72" Hamblet Sheeter with layboy and back-stand.
110" Hamblet heavy duty Mill Type Sheeter.
32" Hobbs & 34" Inman shear cut Slitters.
63" Oswego Power Cutter—to be rebuilt.
14 x 22 John Thomson American heavy duty Woodworking Saw.
Model 10 Bunn Tying Machine.
Baling Presses—NEW—both hand and power.

THOMAS W. HALL COMPANY, Inc.
120 West 42nd St., New York 18, N. Y. TF

DOCTOR RODS—for Carbon and Wax Paper Machines. Precision wound and uncoilable. Blue print and price list on request. Address Box 47-223 care Paper Trade Journal. J-19

PAPER COATING MACHINERY — Waxing, Oiling, Gumming, Gluing, Carbon, Laboratory Coating and Treating Machines. High speed. New improvement. MAYER MACHINE COMPANY, Inc., 1155 Scottsville Road, Rochester, 11, N. Y. TF

FOR SALE—Twenty Three #80 Bronze Fourdrinier Wires. Size 102" x 60'. Low price for quick disposal. Address Box 47-427 care Paper Trade Journal. J-19

WANTED

PAPER MANUFACTURER desires to purchase or invest in converting business of standard paper products. Address Box 46-708 care Paper Trade Journal. TF

WANTED

WANTED

2—150 H.P. Twin Variable Speed Steam Engines
1—100 H.P. Constant Speed Steam Engine
1—150 H.P. 450 R.P.M. Slip Ring Motor, 60 cycle, 3 phase, 440 volt.
2—Belt-driven Jordans equivalent to Standard No. 1

Address: Box 47-469 care Paper Trade Journal J-19

MANUFACTURING SPACE WANTED NEAR WATER

for Moulded Pulp Industry. Required facilities, FREE water—reasonable Power Rates—300 mile radius of New York City. 4,000 to 12,000 sq. ft. considered. Desirable, but not essential, R.R. siding, water power. Will also consider purchase of paper or paper board mill.

LEVENSTEIN, Atty.
2 West 43rd St., N. Y. 19, N. Y.
J-19

PAPER
INTERESTED IN:
SURPLUS LOTS—DAMAGED
Obsolete, etc. Rolls or Sheets
J. J. LEVIS PAPER CO., INC.
4 Gleason St., Methuen, Mass J-19

WANTED — DISCARDED PAPER MILL FELTS. HIGHEST PRICES paid for all kinds of discarded paper mill felts. LARGE or SMALL QUANTITIES accepted. Prices quoted immediately on receipt of samples. ADDRESS GLASER AND YOFFE, INC., 80 NORTH MAIN ST., NATICK, MASS. TF

WANTED—For immediate delivery, one Beck Cutter 40" or larger. Electric eye cutoff if possible. Address Newark Paraffine and Parchment Paper Co., 50 Jelliff Ave., Newark, N. J. J-19

WANTED

WANTED TO PURCHASE

Paper slitter and Rewinder, 120" Wide, rolls Approx. 40" Diameter.
Address Box 47-468 care Paper Trade Journal. J-10

MACHINERY WANTED—1—Induction Motor, 150 HP, 450 RPM, 440 volt, 3 phase, 60 cycle. 1—Synchronous Motor, 80% power factor, 200 HP, 450 RPM, 440 volt, 3 phase, 60 cycle. Also starting equipment for the above motors. Write Sangamon Paper Mills Inc., 137 W. Pershing Rd., Chicago, 9, Illinois. J1-3

WANTED — W & P Shredders, Evaporators, Generators and Boilers, Slitters, Cutters, Hydraulic Presses, Sheridan Presses, Dryers. Address Box 47-70 care Paper Trade Journal. TF

WANTED—Brightwood Box Machine. Address Box 47-71 care Paper Trade Journal. TF

72" SLITTER AND REWINDER WANTED. Must be complete and in good condition. Advise price. Lake Erie Pulp and Paper Company, P. O. Box 604, Monroe, Michigan. J-19

MISCELLANEOUS

WILL EXCHANGE board for laminating, mounting, lining and die-cutting machinery. Address Box 46-707 care Paper Trade Journal. TF

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Converted From Your Used Felts
Write for Full Details
BLOOMFIELD WOOLEN COMPANY
BLOOMFIELD, IND.

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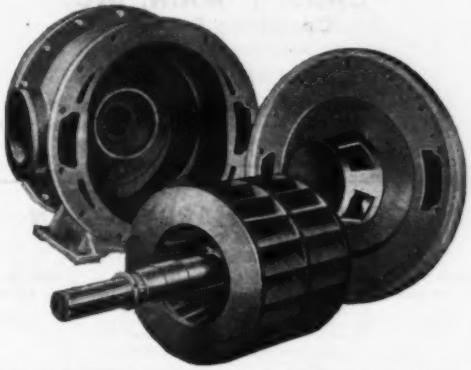

NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

MORDEN MACHINES COMPANY

MORDEN

for STOCK MAKER

Beating and Refining

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ROLLS — BELTS — V-BELTS
HOSE—ENGINEERED MOLDED GOODS

RAYBESTOS-MANHATTAN INC.

MANHATTAN RUBBER DIVISION
EXECUTIVE OFFICES AND FACTORIES PASSAIC, NEW JERSEY

JONES STOCK PREPARATION MACHINERY

Jones-Bertrams Beater
Standard Beating Engines
Jordans
Refiners
Banded and Bandless Jordan Plugs
Beater Rolls
Washing, Bleaching Engines
Stock Chests
Agitating Equipment
Paper Machine Screens
Pulpers, Disintegrators
Dusters of all Kinds
Beater and Jordan Fillings
Teale Flexible Slices

E. D. JONES & SONS COMPANY • PITTSFIELD, MASS.

Appleton Felts MAKE GOOD PAPER

APPLETON WOOLEN MILLS
APPLETON · WISCONSIN

PROMPT RECONDITIONING OF YOUR ROLLS

DURING YOUR SUMMER SHUTDOWN

Lobdell Roll Grinding Service will recondition your calender, couch, press and other rolls and return them promptly with *new* roll accuracy and high finish.

NEW ROLLS OF CHILLED IRON OR PURALOY

Lobdell Rolls—in sizes up to 32" diameter, 180" face—are available in two types: CHILLED IRON, for ordinary machine calendering, have a uniformly hard, long-wearing surface that is highly resistant to abrasion and deformation under load; and "PURALOY", for water finish and high pressure stacks, 10 to 15% harder and more resistant to abrasion and corrosion than ordinary rolls. These and other Lobdell Products for the Paper and Allied Industries are fully described in our Bulletin—write for it, today.

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FORGING HAMMERS

ESTABLISHED 1836
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ROLLS FOR ALL INDUSTRIES

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Formulations to fit your needs

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• NITROCELLULOSE LACQUERS
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DENNIS CHEMICAL CO.
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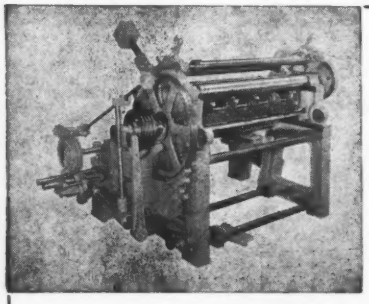

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1614 STEPHENS ST. BROOKLYN, N. Y.

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George F. Hardy Established 1900 John A. Hardy
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ALL TYPES OF COATING MACHINERY
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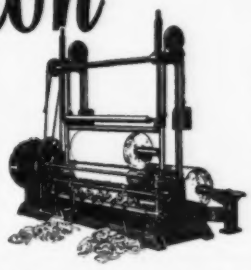
SLITTERS AND ROLL WINDERS
are accurately machined and balanced for high-speed operation. You get "custom tailored" finished rolls.



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Complete Designing and Engineering Service

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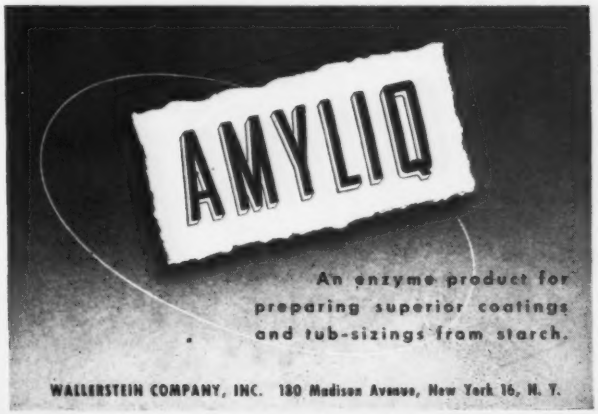
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Manufacturers of Felts of Superior Quality for Every Grade of Pulp and Paper
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Human life has been brightened inestimably and saved many a time by the miracle of telegraphy and the sciences that have grown out of it. Every syllable of every message must be transmitted with absolute fidelity. . . . Only by rigid adherence to the blueprint of Lindsay policy set 44 years ago can we underscore our intention of producing finer and yet finer Fourdrinier wire cloth year after year.

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Norton Co.
Raybestos-Manhattan Inc.
Manhattan Rubber Division

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American Resinous Chemicals Corp.
Arabol Mfg. Co.
Casein Co. of America,
Division of The Borden Co.
Dennis Chemical Company
Hercules Powder Co., Inc.
Monsanto Chemical Co.
Philadelphia Quartz Co.
United States Rubber Co.

AGITATORS
Appleton Machine Co.
Biggs Boiler Works Co.
Dilts Machine Works, Inc.
Dorr Company
Downingtown Mfg. Co.
Corp.
General American Transportation
Improved Paper Machy Corp.
E. D. Jones & Sons Co.
D. J. Murray Mfg. Co
Moore & White Co.
Noble & Wood Machine Co
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Valley Iron Works Co.

AIR CONDITIONING
Westinghouse Electric Corporation

ASBESTOS PRODUCTS
Raybestos-Manhattan Inc.,
Manhattan Rubber Division

BAG MACHINES
Potdevin Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Weber, Herman G.

BALING MACHINES
Thomas W. Hall Co.

BARKERS AND CHIPPERS
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Carthage Machine Co.
D. J. Murray Mfg. Co.
Valley Iron Works Co.

BARS
Dilts Machine Works, Inc.
E. D. Jones & Sons Co.
The Moore & White Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co

BEARINGS
Black-Clawson Company
Jones, E. D., & Sons Co.
Link Belt Company
Magnus Metal Corp.
Raybestos-Manhattan Inc.
Manhattan Rubber Division
Shartle Brothers Machine Co.
SKF Industries, Inc.
Timken Roller Bearing Co.
Valley Iron Works Co.
T. B. Wood's Sons Company

BEATERS & JORDANS
The Appleton Machine Co.
Black-Clawson Company
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Hermann Mfg. Co.
E. D. Jones & Sons Co.
Morden Machines Co.
Noble & Wood Machine Co.
J. J. Ross Company
Ross Paper Machy. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

BED PLATES
Bahr Brothers Mfg. Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Lukenweld, Inc.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

BELTING
Alexander Brothers
Allis-Chalmers Mfg. Co.
Link Belt Company
Raybestos-Manhattan Inc.
Manhattan Rubber Division
J. E. Rhoads & Sons
United States Rubber Co.
T. B. Wood's Sons Company

BLADES
Simonds Saw & Steel Co.

BLEACHERS
Improved Paper Machy. Corp.

BLEACHING BOILERS, ROTARY
The Biggs Boiler Works Co.

BLEACHING APPARATUS
The Biggs Boiler Works Co.
Improved Paper Machy. Co.
E. D. Jones & Sons Co.
Perkins & Sons, Inc., B. F.
Moore & White Co.
Niagara Alkali Co.
Noble & Wood Machine Co.
Roderick O'Donoghue
Pennsylvania Salt Mfg. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.

BLOW PIPES & PITS
Carthage Machine Co.
Kalamazoo Tank and Silo Co.
Moore & White Co.
Murray Mfg. Co., D. J.
Walworth Company

BOILERS
Babcock & Wilcox Co.
Biggs Boiler Works
Foster Wheeler Corp.

BOTTOMS
Harrington & King Perforating Co.
Kalamazoo Tank & Silo Co.
Valley Iron Works Co.

CALENDERS
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
Lobdell Co.
Moore & White Co.
Perkins & Sons, Inc., B. F.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works
Waldron Corp., John

CASEIN
Casein Co. of America,
Division of The Borden Co.
Hercules Powder Co., Inc.

CASTINGS
Appleton Machine Co.
Black-Clawson Company
Carthage Machine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Grinnell Company
Hamblet Machine Co.
E. D. Jones & Sons Co.
Link Belt Company
Lobdell Co.
Magnus Metal Corp.
Noble & Wood Machine Co.
Ryther & Pringle Co., Inc.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Union Machine Company
Union Screen Plate Co.
Valley Iron Works Co.
Walworth Company

CAUSTIC SODA
Pennsylvania Salt Co.

CENTRIFUGAL MACHINERY
Bird Machine Co.
De Laval Steam Turbine Co.
Nichols Engrg. & Research Corp.
Ross, J. O., Eng. Co.
Shartle Brothers Machine Co.
Williams Apparatus Co.

CHAINS
Link Belt Company

CHEMICALS
American Anode, Incorporated
Amer. Cyanamid & Chem. Corp.
Amer. Resinous Chemicals Corp.
Ansul Chemical Co.
Calco Chemical Co.
Calgon, Inc.
The Cowles Detergent Company
Diamond Alkali Co.
Dispersion Process, Inc.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuffs Corp.
Geigy Co., Inc.
Gottesman & Co.
Hooker Electrochemical Company
The Kinsley Chemical Company
Mallinckrodt Chemical Works
The Mathieson Alkali Works, Inc.
Monsanto Chemical Company
Nopco Chemical Co.

TO BUY

Nasgatuck Chemical Div. of U. S Rubber Co.
Niagara Alkali Company
Paper Makers Chemical Department Hercules Powder Co.
Pennsylvania Salt Mfg. Company
Philadelphia Quartz Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
L. Sonneborn Sons, Inc.
United States Rubber Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

CHESTS
Kalamazoo Tank and Silo Co.

CHLORIDE OF LIME
Pennsylvania Salt Co.

CLAY
A. M. Meincke & Sons Inc.

CLEANERS
Adell Chemical Company

CLEANING MATERIALS
Adell Chemical Company
Amer. Cyanamid & Chem. Corp
Bird Machine Co.
The Cowles Detergent Company
The Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc
Paper Makers Chemical Department Hercules Powder Co.
Monsanto Chemical Co.
Nichols Engrg. & Research Corp
Oakite Products, Inc.
Pennsylvania Salt Mfg. Co.
Philadelphia Quartz Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Solvay Sales Corp.
L. Sonneborn Sons, Inc.
Wyandotte Chemicals Corp., J. B. Ford Division

CLUTCHES
Appleton Machine Co.
Black-Clawson Company
Hudson Sharp Machine Company
Farrel-Birmingham Co.
Rodney Hunt Machine Co.
Link Belt Company
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Wks
T. B. Wood's Sons Company

COATING MACHINERY
Gibbs-Brower Company, Inc.
Hudson Sharp Machine Company
Mayer Machine Co.
Moore & White Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
South Wabash Engrg. Co.
Waldron Corporation, John
Weber, Herman G.

COATING MATERIALS
American Anode Div., The B. F. Goodrich Chem. Co.
Dennis Chemical Company

COLORS
Chemical & Pigment Division, The Glidden Company
C. K. Williams & Co.

COMPOUNDED LATICES
American Anode Div., The B. F. Goodrich Chem. Co.

COMPRESSORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
Ingersoll-Rand Co.
Nash Engineering Co.

CONDENSERS
Foster Wheeler Corp.

CONSULTING ENGINEERS
Frederic C. Clark Associates
Ferguson, Hardy S.
Hardy, George F.
Alvin H. Johnson & Co., Inc.
The Kohler System Company
Main, Inc., Chas. T.
The MacPherson Company
Roderick O'Donoghue
The Rust Engrg. Co.
J. E. Sirrine & Co.
South Wabash Engrg. Co.
Stone & Webster Engrg. Corp.
H. G. Weber & Co., Inc.

CONTROLLERS
Black-Clawson Co.
Cochrane Corp.

CONTROLS
The Bristol Company
Cochrane Corp.
Harry W. Dietert Company
Stickle Steam Specialties Co
Westinghouse Electric Corporation

CONVEYORS
Black-Clawson Company
Link Belt Company
Murray, D. J., Mfg. Co.
Ross Engineering Corp., J. O.

COOKING PROCESSES
The Kinsley Chemical Company

COOLING SYSTEMS
Foster Wheeler Corp.

CORES
Elixman Paper Co.
Rodney Hunt Machine Co.
Smith & Winchester Mfg. Co
Sonoco Products Co.
Walker-Goulard-Plehn Co.

COUPLINGS
Black-Clawson Company
De Laval Steam Turbine Co.
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Link Belt Company
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Wks
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John
T. B. Wood's Sons Company

CRANES
Link Belt Company

CUTTERS
Dilts Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Noble & Wood Machine Co.
Perkins & Son, Inc., B. F.
Simonds Saw & Steel Co.
The Smith & Winchester Mfg. Co
South Wabash Engrg. Co.
Taylor Stiles & Co.

DAMPENERS
Perkins & Son, Inc., B. F.
Raybestos-Manhattan Inc., Manhattan Rubber Division
Valley Iron Works Co

DEASPHALTING CHEMICALS
Adell Chemical Company

DECKERS
Improved Paper Machy. Corp.
Oliver United Filters, Inc.

DECKLE STRAPS
Stowe Woodward, Inc.

DE-INKING
Adell Chemical Company
Dilts Machine Works
Kinsley Chemical Co.
Roderick O'Donoghue
Shartle Brothers Machine Co.

DEINKING CHEMICALS
Adell Chemical Company
Philadelphia Quartz Co.

DENSOMETERS
W. & L. E. Gurley

DETERGENTS
Adell Chemical Company
Cowles Detergent Co.
Philadelphia Quartz Co.
L. Sonneborn Sons, Inc.

DEWAXING CHEMICALS
Adell Chemical Company

DIGESTERS
Biggs Boiler Works Co.
Foster Wheeler Corp.
General American Transportation Corp.
Pusey & Jones Corp.

DISPERSING AGENTS
Adell Chemical Company
New York Color & Chemical Co.
L. Sonneborn Sons, Inc.

DOCTORS
Bird Machine Company
Black-Clawson Company
Downingtown Mfg. Co.
Lobdell Co.
Lodding Engineering Corp.
The Sandy Hill Iron & Brass Wks
Shartle Brothers Machine Co.

DOCTOR BLADES
Black-Clawson Company
Lodding Engrg. Corp.
Raybestos-Manhattan Inc. Manhattan Rubber Division
The Sandy Hill Iron & Brass Wks
Shartle Brothers Machine Co.
Simonds Saw & Steel Co.
United States Rubber Co.

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Black-Clawson Company
Gibbs-Brower Company, Inc.
Lukenweld, Inc.
Murray Mfg. Co., D. J.
J. J. Ross Company

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SOUTH WINDHAM, CONNECTICUT

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Special Grades for Beater, Calender and Tub Sizing
Offering a Personalized Service to Industry Since 1907
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QUALITY • UNIFORMITY • SERVICE

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Shartle Brothers Machine Co.
Valley Iron Works Co.

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Appleton Machine Co.
Bird Machine Co.
Black-Clawson Company
Davis, Frank H., Co.
De Laval Steam Turbine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
General Electric Company
Gibbs-Brower Company, Inc.
Rodney Hunt Machine Co.
Link Belt Company
Moore & White Co.
Murray, D. J., Mfg. Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
T. B. Wood's Sons Co.
Westinghouse Electric Corporation
Valley Iron Works Co.

DRYER DRAINAGE
Stickle Steam Specialties Co.

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
E. D. Jones & Son Co.
Moore & White Co.
Noble & Wood Machine Co.
D. J. Murray Mfg. Co.

DYESTUFFS
Calco Chemical Co.
Ciba Company
E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
General Dyestuffs Corp.
National Aniline Division, Allied Chemical & Dye Corp.
C. K. Williams & Co.
Witco Chemical Co.

EMBOSSING ROLLS
Gibbs-Brower Company, Inc.
Northern Engraving & Mch. Co.
Roehlen Engraving Works

EMULSIFIERS
Adell Chemical Company
L. Sonneborn Sons, Inc.

EVAPORATORS
Black-Clawson Company
Foster Wheeler Corp.
General American Transportation Corp.
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

FABRICATED PIPING
Crane Company

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

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Merrick Scale Mfg. Co.
Leeds & Northrup
Milton Roy Pumps
Wallace & Tiernan

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Bloomfield Woolen Co.
Bulkley, Dunton Pulp Co., Inc.
Draper Bros. Corp.
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills, Inc.
Morey Paper Mill Supply Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.

FELT CLEANERS
Adell Chemical Company
The Cowles Detergent Company

FELT GUIDES
Moore & White Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Waldron Corp., John

FIBRILATORS
Paper & Ind. Appliances

FILES
Simonds Saw & Steel Co.

FILLERS
A. M. Meincke & Son Inc.
Amer. Cyanamid & Chem. Corp
Amer. Resinous Chemicals Corp
Johns-Manville Sales Corp.
W. H. Loomis Talc Corp.
Vanderbilt Co., R. T.
Witco Chemical Co.

FILTERS
Cochrane Corp.
General American Transportation Corp.
Improved Paper Machy. Corp.
Moore & White Co.
Oliver United Filters, Inc.
J. O. Ross Engrg. Corp.
Witco Chemical Co.

FITTINGS, PIPE
Crane Company
Walworth Company

FLOORING, GRATING & TREADS
Norton Co.
Raybestos-Manhattan Inc., Manhattan Rubber Division
United States Rubber Co.

FLOOR TREATMENTS
L. Sonneborn Sons, Inc.

FORMATION TESTER
Thwing-Albert Instrument Co.

FORMING MACHINES
Downingtown Mfg. Co.
Noble & Wood Machine Co.
Oliver United Filters, Inc.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
South Wabash Engrg. Co.

FRICTION MATERIALS
Johns-Manville Sales Corp.
Raybestos-Manhattan Inc., Manhattan Rubber Division

FREENESS TESTERS
Testing Machines, Inc.
Williams Apparatus Co.

GASKETS
Raybestos-Manhattan Inc., Manhattan Rubber Division

GEARS
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Link Belt Company
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Wks.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John
Westinghouse Electric Corporation

GRINDERS
Carthage Machine Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Wks.

GRINDING WHEELS
The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
Norton Company
United States Rubber Co.

HEADS
Lukens Steel Company

HEAT EXCHANGERS
Foster Wheeler Corp.
Stickle Steam Specialties Co.
Westinghouse Electric Corporation

HEAT RECOVERY SYSTEMS
Foster Wheeler Corp.
Stickle Steam Specialties Co.

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The Appleton Machine Co.
Armstrong Machine Works
Cochrane Corp.
E. D. Jones & Sons Co.
General Electric Co.
Grinnell Company
Leeds & Northrup
D. J. Murray Mfg. Co.
Ross Engineering Corp., J. O.
Shartle Brothers Machine Co.
Stickle Steam Specialties Co.
Valley Iron Works Co.
Westinghouse Electric Corporation

HOISTS
Appleton Machine Co.
Dilts Machine Works
Rodney Hunt Machine Co.
Ingersoll-Rand Co.
E. D. Jones & Sons Co.

TO BUY

HOSE (Air, Water, Suction, etc.)
Raybestos-Manhattan Inc.
Manhattan Rubber Division
United States Rubber Co.

HUMIDITY CONTROL
Harry W. Dietert Company

HYDRAPULPERS
Dilts Machine Works
Shartle Bros. Machine Co.

IMPREGNANTS
American Anode Div.,
The B. F. Goodrich Chem. Co.
L. Sonneborn Sons, Inc.

INDUSTRIAL ARCHITECTS
The McPherson Company

INDUSTRIAL TRACTORS
Towmotor Corp.

INSTRUMENTS, TESTING AND MEASURING
Ames Company, B. C.
The Barbour Stockwell Co.
Bauer Brothers Co.
N. P. Bowsher
The Bristol Company
Cochrane Corp.
The Foxboro Company
General Electric Company
W. & L. E. Gurley
Leeds & Northrup Company
National Technical Laboratories
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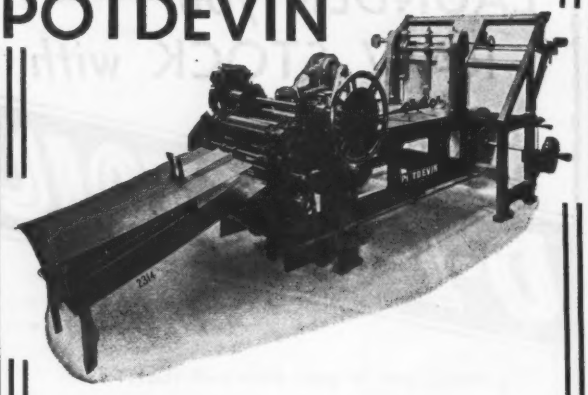

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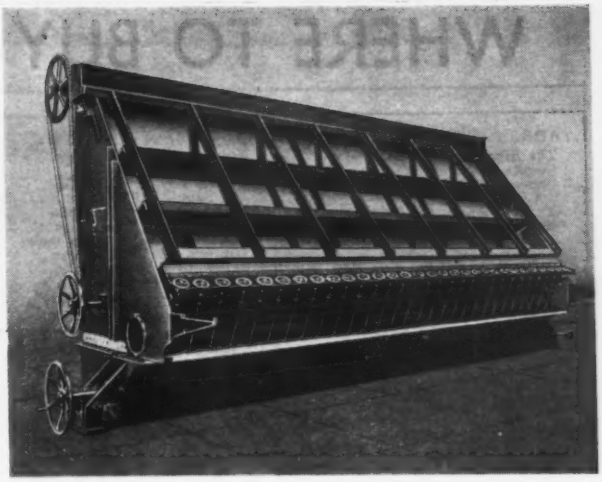

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ADVERTISERS

IN THIS ISSUE

A

Adell Chemical Co. 81
American Lumber & Treating Co. 46
Ames, B. C., Company 83
Appleton Wire Works 76
Appleton Woolen Mills 75

B

Bagley & Sewall Co. 83
Bauer Brothers Company 74
Black-Clawson Company 69
Bloomfield Woolen Co. 74
Buffalo Pumps, Inc. 13
Butterworth, H. W., & Sons Co. 67

C

Calco Chemical Div. 23
Cameron Machine Company ... 81
Clark, Frederic C. 76
Classified Advertising 68
Clinton Industries, Inc. 79
Corn Products Sales Co. 67
Cowles Detergent Co. 82
Crane Company 85

D

Davis, Frank H., Company 72
Dennis Chemical Co. 76
Dilts Machine Works 69
Downingtown Mfg. Co. 2
du Pont, de Nemours & Co., Grasselli Dept. 50

E

Egan & Co., Frank W. 76
Electric Storage Battery Co. ... 9
Elixman Paper Core Co. 64
English China Clays Sales Corp. 66

F

Farrel Birmingham Co. 43
Ferguson, Hardy S., & Co. 76

G

Gardner Pattern & Model Works 76
Gibbs-Brower Co., Inc. 72
Givaudau Delawanna Inc. 31
Goslin Birmingham Mfg. Co., Inc. 76
Goodrich Chemical Co. 3
Gottesman & Company ..Front Cover
Great Atlantic Paper Co. 48

H

Hall, Thomas W., Company ... 70
Hamblet Machine Co. 66
Hansson Inc., Elof 41
Hardy, George F. 76
Harrington & King Perf. Co. .. 77

J

Jones, E. D., & Sons Co. 75

K

Kalamazoo Tank & Silo Co. ... 80
Kinsley Chemical Co. 77
Knox Woolen Company 77
Koppers Co., Inc. 17

L

LaBoiteaux Co., Inc., The 47
Langston, Samuel M., Company 77
Lindsay Wire Weaving Co. ... 78
Lobdell Company 75
Lockport Felt Company 66

M

Main, Charles T., Inc. 76
Mayer Machine Company 77
McPherson Company, The 76
Mead Sales Corp. 29
Moore & White Co. 15
Morden Machine Co. 75
Morris Machine Works 40
Murray Mfg. Co., D. J. 78

N

Nash Engrg. Company 25
Nopco Chemical Co. 44

O

Oakite Products, Inc. 64
Orr Felt & Blanket Co. 4
Osborne Paper Mill Equipt. Corp. 73

P

Paper & Ind. Appliances 25
Penn. Salt Mfg. Co. 35
Philadelphia Quartz Co. 63
Potdevin Machine Company ... 82
Price & Pierce, Ltd. 80
Pusey & Jones Co. 6

R

Raybestos-Manhattan Inc. 75
Raymond, C. P., Service 68
Roehlen Engraving Co. 77
Res. Products & Chem. Co. .. 11
Ross, J. J., Company 70
Ross Paper Machy. Co. 71
Rust Engineering Co. 76

S

Seaboard Air Line Ry. 65
Shartle Brothers Machine Co. 69
Simonds Saw & Steel Co. 33
Smith & Winchester Mfg. Co. . 79
Spain, H. M., & Company 77
St. Regis Paper Co. 26

T

Texas Gulf Sulphur Co. 39
Timken Roller Bearing Co. Back Cover
Towmotor Corp. 38

V

Valley Iron Works Co. 37
Virginia Smelting Co. 63

W

Walworth Co. 37
Wallerstein Co. 77
Waterbury, H., & Sons Co. 76
West Va. Pulp & Paper Co. .. 64

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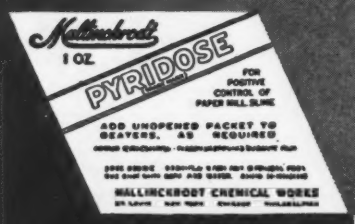

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IN THIS ISSUE

JUNE 26, 1947

Million In Pulpwood Saved After Storm 7
Holyoke Wage Adjustments Add Half-Million To Labor Cost 7
Waxed Paper Group Meets In Canada 8
Thilmany Completes Plans For Power Plant Additions 10
Newsprint Plans Gary De-Inking Plant 10
Container Demand Jumps In Indiana 12
Canada's Pulp Paper Reach $163 Million ... 12
FINANCE 14
Congress Buys Paper For Third Quarter 16
South America Looks To North, Says Rivers .. 16
T. & H. "Postwar Plan" Involves $400,000 ... 18
Mando Opens Research For Public Inspection 18
IMPORTS 21
TRENDS 30
PRICES 32
MARKETS 34
Liquon Introduces Silica-Removal Units 36
Harren & McCormack Join National Adhesives 36
OBITUARY 40
TAPPI Meets At Poland Springs 44
PRODUCTION RATIO REPORT 48
EDITORIAL 49
CLASSIFIED ADVERTISING 66

Technical Section ("TAPPI")

Preparation of Magnesium-Oxide Standard for Spectral Reflectivity 51
Bleaching Pulp with Mixtures of Chlorine Dioxide and Chlorine 53
Evaluation of Different Methods of Speck Counts in Paper 56

INDEX TO ADVERTISERS ON PAGE 80

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CALENDAR OF COMING EVENTS

September 3-6, 1947—TAPPI Fundamental Research Meeting, Appleton, Wis.

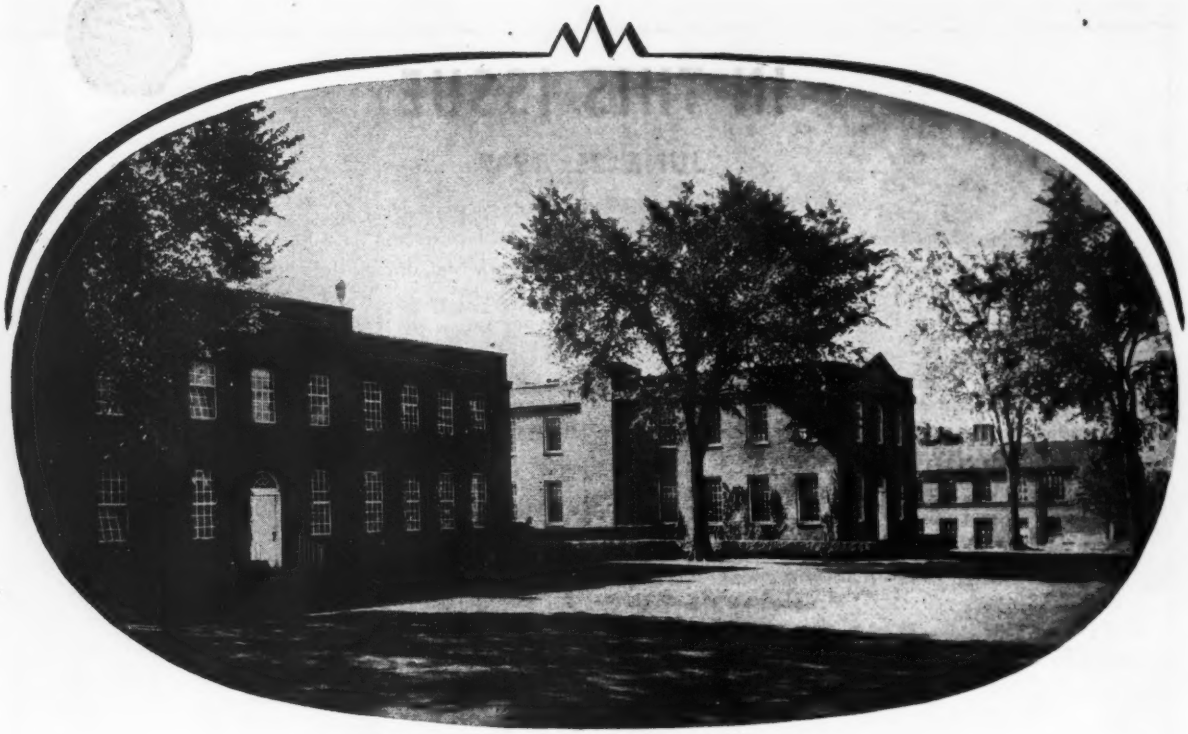
September 24-27, 1947—TAPPI Acid Pulping Meeting, Minneapolis, Minn.

October 9-11, 1947—TAPPI Alkaline Pulping and Chemical Products Meeting, Asheville, N. C.

October 27-29, 1947—The National Paper Trade Association of the U. S., Inc., Semi-annual Convention, Hotel Sherman, Chicago.

November 3-5, 1947—TAPPI Second Engineering Conference, Philadelphia, Pa.

May 18-20, 1948—American Pulp and Paper Mill Superintendents Association, Annual Meeting, Roosevelt Hotel, New Orleans, La.



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